C21.5: 951/4

Vol. 951 Number 4

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

October 26, 1976

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

October 26, 1976 Volume 951 Number 4

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PATENT AND TRADEMARK OFFICE NOTICES

Indication of Changes in Rules

The Office of the Federal Register now accepts for publication rule change proposals in which additions are enclosed between arrows (►◄) and deletions are enclosed in brackets ([ ]). This format will be used by the Patent and Trademark Office whenever appropriate since it permits an easy determination of what changes are proposed without the need for making a side-by-side comparison with the current rule language.

Although the Federal Register permits the use of arrows and brackets only in rule change proposals because a clean copy of the promulgation is desired for use in printing the Code of Federal Regulations, the Publication in the OFFICIAL GAZETTE of both the proposal and the promulgation of rule changes will contain the arrows and brackets whenever changes are made in current rules. If a rule change substantially rewrites, adds, or deletes entire rules, arrows and brackets will not be used.

Arrows are used rather than underlining to show additional subject matter since underlining and italics are to be used in rules for items such as scientific terms and paragraph headings.

Dated: Oct. 5, 1976.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before November 19, 1976:

Bull, Andrew D., Smart & Biggar, 70 Gloucester St., Ottawa, Ontario, Canada
Fanti, Joseph, Smart & Biggar, 70 Gloucester St., Ottawa, Ontario, Canada
Lipsey, Charles E., 4404 Island Pl., #203, Annandale, Va. 22003
McGraw, James, Smart & Biggar, 70 Gloucester St., Ottawa, Ontario, Canada
Trott, Trevor, Smart & Biggar, 70 Gloucester St., Ottawa, Ontario, Canada
Wilkes, Robert A., Smart & Biggar, 70 Gloucester St., Ottawa, Ontario, Canada

LUTRELLE F. PARKER,
Chairman, Committee on Enrollment.

TITLE 37—PATENTS, TRADEMARKS AND COPYRIGHTS

Chapter I—Patent and Trademark Office, Department of Commerce

Certificate of Mailing of Correspondence

On June 21, 1976, notice was published in the Federal Register (41 FR 24895) of a proposal to amend Title 37, Code of Federal Regulations by adding new §§ 1.8, 3.55 and 4.23. Interested persons were invited to comment on the proposal on or before August 20, 1976. Twenty-two comments were submitted. Nineteen were favorable to the proposal and two were neutral. One adverse comment was received. Consideration was given to these comments, as well as to 147 comments received in response to an earlier notice published in the OFFICIAL GAZETTE of the Patent and Trademark Office on January 20, 1976 (942 O.G. 1073). Of these 147 comments, 131 were in favor of a certificate of mailing procedure, 11 were opposed and 5 were neutral. Both sets of comments, and a summary and analysis of each set, are available for public inspection in Room 11E10 of Crystal Plaza Building 3 at 2021 Jefferson Davis Highway in Arlington, Virginia.

These rule changes are intended to solve, in part, the problems caused by delays in the delivery of papers by mail to the Patent and Trademark Office within the time periods set for response by applicants. Except in those cases spelled out in new § 1.8, papers and fees will be considered as being timely filed if they are deposited with the U.S. Postal Service on or before the expiration of the period set for response. However, the date of deposit in the mails will be considered only to determine the timeliness of the response. The actual date of receipt of the correspondence or fee will continue to be used for all other purposes, such as for example, determining when an appeal brief is due (two months after the receipt of the Notice of Appeal, 37 CFR 1.192).

The exceptions spelled out in new § 1.8 are intended to exclude from the new procedure those cases where filing in the Office, or with the Commissioner, is a requirement of statute. In view of five comments questioning the authority of the Commissioner to adopt the new procedure, two further exceptions have been included in § 1.8. In all other cases, the new procedure would not be inconsistent with statute, and therefore would be within the authority of the Commissioner to adopt. The suggestion, advanced in eight comments, that there should be no exceptions, was not adopted.

One comment suggested that attestation be made on a personal knowledge basis and this suggestion has been adopted. In response to another comment, the text of § 1.8 has been amended to indicate more clearly who may sign the certificate. Finally, several comments expressed concern about the possibility of fraud. However, the use of a post card receipt (see Notice dated November 21, 1968) would seem to minimize this possibility.

The addition of a new § 1.8(a) establishes a Certificate of Mailing procedure. New § 1.8(b) would establish a procedure for situations where correspondence is deposited under § 1.8(a) but is not delivered.

Form § 3.55 is designed for use in patent cases and form § 4.23 is designed for use in trademark cases when making a certificate under § 1.8(a).

In consideration of the comments received and pursuant to the authority contained in section 6 of the Act of July 19, 1952, as amended (85 Stat. 364; 35 U.S.C. 6), Parts 1, 3 and 4 of Title 37, Code of Federal Regulations, are hereby amended as follows:

PART 1—RULES OF PRACTICE IN PATENT CASES

1. By adding a new § 1.8 as follows:

§ 1.8 *Certificate of mailing.*

(a) Except in the cases enumerated below, papers and fees required to be filed in the Patent and Trademark Office within a set period of time will be considered as being timely filed if (1) they are addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, and deposited with the United States Postal Service with sufficient postage as first class mail prior to expiration of the set period, and (2) they are accompanied by a certificate stating the date of deposit (see forms, §§ 3.55 and 4.23). The person signing the certificate should have reasonable basis to expect that the correspondence would be mailed on or before the date indicated. The actual date of receipt of the paper or fee will be used for all other purposes. This procedure does not apply to the following:

(i) The filing of patent applications;

(ii) The filing of trademark applications;

(iii) The filing of agreements between parties to an interference under 35 U.S.C. 135(c);

(iv) The filing of an affidavit showing that a mark is still in use or containing an excuse for nonuse under Section 8(a) or (b) or Section 12(c) of the Trademark Act, 15 U.S.C. 1058(a), 1058(b), 1062(c);

(v) The filing of an application for renewal of a mark registration under Section 9 of the Trademark Act, 15 U.S.C. 1059;

(vi) The filing of a petition to cancel a registration of a mark under Section 14(a) or (b) of the Trademark Act, 15 U.S.C. 1064(a), 1064(b);

(vii) The filing of an affidavit under Section 15, subsection (3) of the Trademark Act, 15 U.S.C. 1065;

(viii) The filing of a notice of election to proceed by civil action in an inter partes proceeding under 35 U.S.C. 141 or Section 21(a)(1) of the Trademark Act, 15 U.S.C. 1071(a)(1), in response to another party's appeal to the Court of Customs and Patent Appeals;

(ix) The filing of a notice and reasons of appeal under 35 U.S.C. 142 or a notice of appeal under Section 21(a)(2) of the Trademark Act, 15 U.S.C. 1071(a)(2); and

(x) The filing of a statement under 42 U.S.C. 2182 or 42 U.S.C. 2457(c).

(b) In the event that correspondence or fees are timely filed in accordance with paragraph (a) of this section, but not received in the Patent and Trademark Office, and the application is held to be abandoned or the proceeding dismissed, terminated, or decided with prejudice, the correspondence or fee will be considered timely if the party who forwarded such correspondence or fee (1) informs the Office of the previous mailing of the correspondence or fee promptly after becoming aware of the Office action, (2) supplies an additional copy of the previously mailed correspondence or fee and certificate, and (3) includes a declaration under § 1.68 or §2.20 which attests on a personal knowledge basis or to the satisfaction of the Commissioner to the previous timely mailing.

PART 3—FORMS FOR PATENT CASES

2. By adding a new §3.55 as follows.

§ 3.55 *A suggested format for the certificate under 37 CFR 1.8(a) to be included with the correspondence.*

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on ----------
Date

Name of applicant, assignee, or Registered Representative

Signature

Date

PART 4—FORMS FOR TRADEMARK CASES

3. By adding a new § 4.23 as follows.

§ 4.23 *A suggested format for the certificate under 37 CFR 1.8(a) to be included with the correspondence.*

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on ----------
Date

Name of applicant, assignee, or applicant's attorney

Signature

Date

Effective date: These amendments shall become effective on November 1, 1976.

Dated: September 28, 1976.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Approved: September 17, 1976.

BETSY ANCKER-JOHNSON,
Assistant Secretary for Science and Technology.

[FR Doc. 76-28915; Filed 10-1-76; 8:45 am]

Patent Examining and Appeal Procedures

[37 CFR Part 1]

Proposed Rulemaking

Notice is hereby given that, pursuant to the authority contained in section 6 of Title 35 of the United States Code, the Patent and Trademark Office proposes to amend Title 37 of the Code of Federal Regulations by revising or amending §§ 1.11, 1.14, 1.52, 1.56, 1.65, 1.175, 1.194, 1.196, 1.291, 1.292 and 1.346, and by adding §§ 1.69, 1.97, 1.98, 1.99 and 1.109.

All persons are invited to present their views, objections, recommendations or suggestions relating to the proposed rule changes to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, on or before December 7, 1976, on which date a hearing will be held at 9:30 a.m. in Room 11–C24, Building 3, 2021 Jefferson Davis Highway, Arlington, Virginia. All persons wishing to be heard orally at the hearing are requested to notify the Commissoner of their intended appearance. All comments received will be available for public inspection in Room 11–E10 of Building 3.

This proposal has been reviewed pursuant to EO 11821 and OMB Circular A–107 and determined to have no major inflationary impact.

BACKGROUND

The purpose of the proposed changes is to improve the quality and reliability of issued patents by strengthening patent examining and appeal procedures.

In recent years there has been extensive public discussion concerning the U.S. patent examining system. Much of it stemmed from the 1966 Report of the President's Commission on the Patent System. The Commission made 35 recommendations for improvements, most of them requiring legislation. As a result, bills were introduced in the 90th Congress in 1967 and hearings were held on those and subsequent bills. The most recent patent bill to receive Congressional attention, S. 2255, 94th Congress, was passed by the Senate on February 26, 1976. It now appears, however, that no patent legislation will be enacted during the current year.

Certain of the proposals that have been made in the various bills can be implemented under the Commissioner's rulemaking authority and within the confines of the Office's current budget. In other cases more limited changes can be implemented in this way. Since it may be some time before the law is revised, it is believed appropriate at this time to consider rule changes of this nature. The Patent and Trademark Office has prepared the present proposals after a review of the various bills and taking into account comments and suggestions received from interested parties.

In addition to strengthening examining and appeal procedures, the proposed rules might serve as models for subsequent legislation or simplify the patent law revision effort by dispensing with the need for certain legislative changes. The proposed rules are intended to: (1) permit patent owners and others to bring new prior art to the attention of the Office more readily through reissue applications; (2) assist examiners by providing them with "patentability statements" in all applications; (3) define and clarify the duty of applicants and others to bring information relevant to pending applications to the attention of the examiner; (4) modify the requirements for oaths and declarations to help ensure that relevant information is disclosed; (5) make available to the public Office decisions that would be of important precedent value; (6) refine the existing rules governing public use proceedings and protests to the grant of patents; (7) modify appeal procedures to authorize, in appropriate cases, oral arguments by examiners and rejections of allowed claims by the Board; and (8) create a more complete record of reasons for allowing patents.

REISSUE APPLICATIONS

Proposed § 1.175 permits a patent owner to have new prior art considered by the Office by way of a reissue application without making any changes in the claims or specification. Existing § 1.175 requires reissue applicants to file an oath or declaration alleging that they believe "the original patent to be wholly or partly inoperative or invalid * * *" This requirement is dispensed within proposed § 1.175(a)(1) unless the applicant believes this to be the case. New paragraph (a)(4) recognizes that reissues may be filed to have the patentability of the original patent considered in view of prior art or other information relevant to patentability which was not previously considered by the Office.

Thus the proposed section permits a patentee to file a reissue if he believes his patent is valid over prior art not previously considered by the Office but would like to have a reexamination. The procedure could be used at any time during the life of a patent. During litigation a court might, if it chose, stay proceedings to permit new art to be considered

initially by the Office in a simpler and less expensive proceeding. In accordance with existing § 1.176, reissue applications will continue to be acted on by the examiner in advance of other applications.

If a reissue application is filed as a result of new prior art with no changes in the claims or specification and the examiner finds the claims patentable over the new art, the application will be rejected as lacking statutory basis for a reissue, since 35 U.S.C. 251 does not authorize reissue of a patent unless it is "deemed wholly or partly inoperative or invalid." However, the record of prosecution of the reissue application will indicate that the prior art has been considered by the examiner.

Proposed § 1.11 opens reissue applications to inspection by the general public. It is already Office policy to open reissue applications to inspection by opponents of the patentee in litigation or an interference at the opponent's request. The proposed rule opens all reissue applications. Since reissue applications contain no new disclosure, and therefore no trade secrets or confidential information, they are considered to present a "special circumstance" within the meaning of 35 U.S.C. 122.

Proposed § 1.11(b) provides for announcement of the filings of reissue applications in the OFFICIAL GAZETTE. This announcement would give interested members of the public an opportunity to submit to the examiner information pertinent to patentability of the reissue application. However, in accordance with proposed § 1.291 members of the public will not be permitted to participate as parties in proceedings before the examiner. See discussion below.

PATENTABILITY STATEMENT

Proposed §§ 1.97–1.99 provide for the filing of a patentability statement, similar to what has sometimes been called a patentability "brief," in every patent application. The statement would assist examiners by informing them of the relevant prior art considered by the applicant and giving an explanation of the most relevant references before they undertake their searches. The statement is not intended to serve as a substitute for the search by the examiner, but only as a starting point and supplement for the search. The statement should provide a more complete written record distinguishing the claims from the prior art.

While the statement will impose some additional burden on applicants, applicants are already required by existing law to bring pertinent information to the attention of the examiner. The statement will serve as a reminder to applicants, attorneys and agents of their responsibility for citing pertinent information.

The patentability statement proposal represents an extension of the Office's existing policy on citation of prior art by applicants.[1] The proposal is similar to the rule change proposal published on September 9, 1969,[2] and to section 131(b) of S. 2255, 94th Congress.

Proposed § 1.97(a) requires the statement to be filed within two months after filing an application, in order to make it available by the time of the examiner's first action. Paragraph (b) makes clear that applicants will not be refused an examination or a patent for any inadvertent failure to comply with the requirements for the statement. Paragraph (c) is intended to avoid any inference as to the thoroughness of any search that is made, or any implied obligation to make any search at all.

Section 1.98(a), specifying the content of the statement, requires a listing of relevant information and a "concise" explanation of the references considered most relevant. This emphasizes that a lengthy legal document is not desired. The term "patentability brief" is avoided because the statement contemplated generally would be less detailed than an appellate brief. Only the key features of pertinent references and the most important differences from the claimed invention need be discussed in a few sentences.

Section 1.98(a) states that the statement is to explain why the invention is patentable over prior art which the applicant considered most "relevant" during preparation of the application. The term "relevant" is defined. As to the "most relevant" references, the requirement is for an explanation of those references which meet this qualification in the opinion of the applicant, which will not necessarily be the same as the opinion of the examiner or subsequent reviewing body. The requirement that only the most relevant references need be explained is an attempt to minimize extra burden on the applicant and the Office.

It of course requires persons to exercise judgment in deciding what information to cite. No way has been found to avoid the exercise of judgment if the examiner is to be provided only with information useful to him. The intent of the Office is to avoid penalizing persons for good faith errors in judgment in deciding what information to bring forward. Reasons for patentability need not be stated if no relevant information was considered in preparing the application. The statement could comprise a mere statement that no information was considered.

Proposed § 1.98 requires, except in the case of duplicative references, that a copy of the pertinent portion of each patent or publication considered relevant be submitted. This includes copies of United States patents as well as foreign patents. While patents are of course available in the Office, if the applicant does not include copies the examiner will have to interrupt his examination until copies can be ordered or located. Since the person making the citation has copies in hand, it is believed that an overall saving in time can be achieved by requiring the applicant to supply the copies in all cases. With the widespread availability of copying equipment this burden is now less than in the past. While translations of pertinent portions of foreign language references will be helpful to the examiner, this has not been made a requirement of the proposed rule. When existing translations are readily available they should be submitted.

Proposed § 1.99 provides for updating patentability statements. This is consistent with the duty under existing case law to cite relevant information at any time during the prosecution of an application.

DUTY OF DISCLOSURE

Proposed § 1.56 defines the duty to disclose information to the Office and the criteria for striking an application when that duty is violated. The proposal codifies the existing Office policy on fraud and inequitable conduct, which is believed consistent with the prevailing case law in the Federal courts. The expanded wording of § 1.56 is intended to be helpful especially to those individuals who are not expert in the judicially developed doctrines concerning fraud. The section should have a stabilizing effect on future decisions in the Office and, although not binding on them, may perhaps offer useful guidance to the courts.

The first sentence of § 1.56(a) names the individuals who have a duty to disclose information to the Office. The second sentence states that the duty is to disclose all information that they believe might reasonably be expected to affect a decision of the examiner.[3] It is somewhat more than that information which in fact would or should cause the examiner to reject claims allowable "but for" the information.[4] As noted below, however, paragraph (c) of proposed § 1.56 does not necessarily provide for a penalty when relevant information is not disclosed. The third sentence of paragraph (a) makes clear that the duty of disclosure is less for those persons who are less involved in the preparation or prosecution of the application.

Proposed § 1.56(b) retains the substance of existing § 1.56 and further defines with more particularity the grounds for striking an application. Since the courts have held patents unenforceable under the equitable doctrine of unclean hands when the requirements for fraud in the common law sense are not met, the term "inequitable conduct" is added to the rule. Paragraph (b) also makes clear that a failure to comply with the duty of disclosure may amount to fraud or inequitable conduct.

Paragraph (c) sets forth the criteria that must be satisfied before an application will be stricken for failing to comply with the duty of disclosure. It is believed to reflect the current state of the case law. For fraud or inequitable conduct most courts require "clear and convincing evidence" and an intent to withhold information, or gross negligence equivalent to intent.[5] The cases are not uniform on how material or relevant the information withheld must be. Paragraph (c)(1) adopts a "might reasonably be expected to affect" test.

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[1] See notice of August 12, 1974, 926 O.G. 2.
[2] 34 FR 14176, 866 O.G. 1402.
[3] See S. 2255, 94th Congress, § 131(b)(1)(B).
[4] See e.g., In re Multi-District Litigation Involving Frost Patent, 398 F. Supp. 1353, 1369, 185 USPQ 729, 741 (D. Del. 1975); Kayton et al., Fraud in Patent Procurement: Genuine and Sham Charges, 43 Geo. Wash. L. Rev. 1, 40 (1974).
[5] E.g., Norton v. Curtiss, 433 F. 2d 779, 167 USPQ 532 (CCPA 1970).

Paragraph (c), however, establishes only the minimum requirements that must be met for striking an application. It leaves the Office with discretion to require a higher degree of materiality (for example, a "but for" test) in appropriate circumstances.

Proposed § 1.346 explicitly requires a reasonable basis to support every assertion of improper conduct under § 1.56 made by a registered practitioner in any Office proceeding. The change in § 1.346 is not a change in substance but is only for emphasis. Concern has been expressed over the increasingly common practice of making "boiler plate" allegations of fraudulent procurement. Proposed § 1.346 gives specific notice that groundless charges of fraud or inequitable conduct may serve as a basis for disciplinary proceedings against registered practitioners under § 1.348.

OATHS AND DECLARATIONS

Proposed § 1.69 is intended to correct the anomalous situation in which foreign applicants are required to sign an oath or declaration in a language that they may not understand. It requires use of a language which is understood.

Proposed § 1.69(a) requires that persons must understand the content of documents to which foreign language oaths or declarations relate. The term "understands" provides flexibility for persons who cannot read the language in which the specification and claims are written to have the content explained to them.

Proposed § 1.69(b) anticipates that the Office will publish oaths and declaration forms in the languages of those countries from which a significant number of applications are received. An applicant who does not or is unable to use such a form, or any reproduction of such a form, must submit a verified English translation of the oath or declaration at the time it is filed. An exception is made for oaths or declarations under § 1.65, for which a verified English translation may be filed no later than two months after the filing date.

Proposed § 1.52 is changed to be consistent with the requirement of § 1.69 for foreign language oaths and declarations.

Proposed § 1.65(a)(1) requires inventors to acknowledge a duty to disclose information relevant to the patentability of their inventions. While the oath will not define the duty of disclosure fully, acknowledgement in general terms that such a duty exists will emphasize the importance of the duty to inventors who may not be familiar with the requirements of patent law and regulations. If this proposal is adopted the change in § 1.65 also would be incorporated in all appropriate sections in 37 CFR Part 3, "Forms for Patent Cases."

DECISIONS MADE PUBLIC

Proposed § 1.14(d) is intended to make more explicit the conditions under which significant decisions of the Patent and Trademark Office will be made available to the public. The proposed rule includes reference to decisions of the Board of Patent Interferences as well as the decisions of the Board of Appeals and the Commissioner, which were previously covered.

It provides for public dislosure of the subject decisions whenever the applicant or party in interest fails to take the prescribed steps to prevent such disclosure after being given appropriate notice. It is applicable in the case of decisions that would have significant precedent value, where such decisions are contained in either pending or abandoned applications or in interference files not otherwise open to the public. It places the burden on the Office to identify significant decisions. It is anticipated that no more than a few dozen decisions each year would be considered of sufficient importance for publication under the authority of this paragraph.

PROTESTS AND PUBLIC USE PROCEEDINGS

Proposed §§ 1.291 and 1.292 give greater recognition to the value of written protests and public use petitions as aids in avoiding the issuance of invalid patents.

Section 1.291(a) provides that protests will be entered in the application file and will, if they meet stated requirements, be considered by the examiner. To guarantee consideration by the examiner, protests would have to be accompanied by copies of prior art documents relied upon, although protests without copies would not necessarily be ignored. This is similar to the requirement of proposed § 1.98 that copies of patents and publications accompany patentability statements. § 1.291 does not contemplate permitting a protester to participate in any further proceeding as a party. In the case of applications available to the public, such as reissue applications, the protester could file papers rebutting statements made by the applicant. The examiner at his discretion might request a protester to submit additional written information or might provide extra time for comments by a protester to be filed.

Section 1.291(b) incorporates the existing Office policy of permitting persons to submit prior art citations or copies of prior art after a patent has been granted.[6] The material submitted is not examined by the Office, but is available to members of the public inspecting Office records.

Materials submitted to the Office under §§ 1.291 and 1.292 are to be served upon the applicant, patentee, attorney or agent when possible. If service is not possible, materials are to be submitted in duplicate so that the Office can attempt to send the duplicate copy.

In § 1.292 the requirement that petitioner offer to bear the Office's expenses in conducting the public use proceeding is deleted.

Proposed § 1.292 is also intended to ensure that the application file wrapper records the existence of public use proceedings. Notice of a petition for a public use proceeding will be entered in the file in lieu of the petition itself when the petition and the accompanying papers are too bulky to physically accompany the file. Any public use papers not physically entered in the file will be publicly available whenever the application file wrapper itself is available.

PATENT APPEALS

Proposed § 1.194, first, makes clear that oral hearings should be requested only when the appellant considers a hearing necessary or desirable for a proper presentation of his appeal and, second, provides for oral arguments by examiners before the Board in certain appeals.

In most instances, well-written, fully developed arguments in the appellant's brief and the examiner's answer are the most effective way of arguing a case before the Board of Appeals. The legal and technological issues presented in appeals are, for the most part, best presented and understood using the precision of the written word. No adverse implications will be drawn as to the merits of the appeal from an applicant's waiving an oral hearing.

If an appellant considers an oral hearing necessary or desirable for a proper presentation of his appeal, an oral hearing will be scheduled upon request.

Proposed § 1.194(b) permits oral argument by, or on behalf of, the primary examiner whenever either the examiner or the Board believes it would be helpful. It incorporates the present practice of permitting examiners to present oral argument before the Board of Appeals (MPEP 1209). It gives the Board the additional discretionary authority to require examiners to present oral argument to ensure that all issues are fully and accurately presented.

It has been the Board's experience that effective oral argument, when needed, can be presented in less than the 30 minutes allowed in the present rule. Since March 20, 1975, it has been the Board's practice to limit oral argument to 20 minutes.[7] This practice is reflected in the proposed rules. Arguments by examiners would also be limited to a maximum of 20 minutes. It is anticipated that examiners often would utilize substantially less than 20 minutes since their role would be one of rebuttal and answering questions.

Proposed § 1.196(b) authorizes the Board of Appeals to reject allowed claims. The Board's lack of authority in the past has resulted in some anomalous situations. This proposal is not intended, however, as an instruction to the Board to reexamine every allowed claim in every appealed application. It is intended to give the Board authority to act when it becomes apparent during the Board's consideration of rejected claims that one or more allowed claims should also be rejected, on either the same or on different grounds than applied against the rejected claims.

Although the statutory authority of the Board of Appeals to review "adverse decisions of examiners" (35 U.S.C. 7) has not been narrowly construed,[8] it has been held that since a general rule authorizing review of favorable decisions of

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[6] See notice of August 12, 1974, 926 O.G. 2.

[7] See notice of March 20, 1975, 933 O.G. 1010.

[8] In re Loehr, 500 F.2d 1390, 183 USPQ 56 (CCPA 1974); In re Haas, 486 F.2d 1058, 179 USPQ 623 (CCPA 1973); In re Hengehold, 58 CCPA 1099, 169 USPQ 473, 480 (1971); In re Searles, 164 USPQ 623 (CCPA 1970).

the examiner has not been promulgated, the Board lacked such authority.[9]

The Commissioner can "prescribe as a rule of practice, generally applicable, that a favorable decision by a primary examiner may be reviewed, in the Commissioner's behalf, by some officer or by some board to which has been delegated the duty of making such review." [10] Proposed § 1.196(b) exercises the Commissioner's discretion to designate the Board of Appeals to review in their capacity as Examiners-in-Chief favorable decisions by the examiner in cases which are otherwise before it.

As proposed, § 1.196(b) would permit an applicant, at his option, to waive reconsideration by the examiner and by the Board of Appeals and treat the Board's rejection of allowed claims as the final decision of the Board. If the applicant elects to follow that course, the Board's rejection of allowed claims would be directly reviewable by the Court of Customs and Patent Appeals or the District Court for the District of Columbia.[11]

REASONS FOR ALLOWANCE

Proposed § 1.109 authorizes examiners to prepare a written record of the reasons for allowing claims in an application when they believe the reasons will not be apparent from other papers of record. In many cases the reasons for allowance will be evident from the examiner's rejections and the applicant's amendments and arguments overcoming the rejections. Moreover when the examiner's reason for allowance is merely that he can locate no relevant prior art, a statement of reasons probably will be meaningless.

On the other hand, courts and others occasionally have commented that statements of examiners' reasons for allowance would be useful in some circumstances.[12] When an applicant submits several arguments for allowing a claim and the examiner finds not all of them persuasive, an explanation could be helpful to anyone later attempting to evaluate the patent. When an examiner withdraws a rejection for reasons not suggested by the applicant, an explanation could be useful.

Proposed § 1.109 gives the examiner discretion as to whether to prepare a statement of reasons for allowance. The last sentence of proposed § 1.109 permits the applicant to file a statement commenting on the reasons for allowance. Although the examiner would routinely consider the applicant's comments, his reasons would not ordinarily be amended. It is anticipated that the Patent and Trademark Office would prepare guidelines for examiners on administration of the rule. An experiment might be undertaken with a small number of applications before deciding whether to adopt a permanent rule.

PROPOSED RULES

The text of the proposed added and revised sections and paragraphs of sections is as follows (additions are indicated by arrows ; deletions are bracketed) :

§ 1.11 *Files open to the public.*

* * * * *

(b) ►All release applications and applications◄ [Applications] in which the Office has accepted a request filed under § 1.139 ►, and related papers in the application file,◄ are open to inspection by the general public, and copies may be furnished upon paying the fee therefor. ►The filing of reissue applications will be announced in the OFFICIAL GAZETTE.◄

§ 1.14 *Patent applications preserved in secrecy.*

* * * * *

(d) ►Any decision of the Board of Appeals or the Board of Patent Interferences, or any decision of the Commissioner on petition,◄ [Selected decisions of the Board of Appeals, or of the Commissioner, in abandoned applications] not otherwise open to public inspection ►(§ 1.11 and paragraphs (a) and (b) of this section) shall◄ [(paragraph (b) of this section) may] be published or made available for ►public inspection if : (1) The Commissioner believes the decision involves an interpretation of patent laws or regulations that would be of important precedent value ; and (2) the applicant, or any party involved in the interference, does not, within one month after being notified of the intention to make the decision public, object in writing on the ground that the decision discloses a trade secret or other confidential information. If a decision discloses such information, the applicant or party shall identify the deletions in the text of the decision considered necessary to protect the information. If it is considered the entire decision must be withheld from the public to protect such information, the applicant or party must explain why. Applicants or parties will be given time to request reconsideration and seek court review before any portions of decisions are made public over their objection◄ [publication at the Commissioner's discretion, unless the applicant timely presents sufficient reasons for not doing so. The applicant will be notified, through the attorney of record in the application file, when it is proposed to release such a decision and a time not less than thirty days set for presenting any such reasons. The fact that the subject matter of the application has not been made public in any manner, or that the same subject matter is being prosecuted in a pending application, will be considered sufficient reason for not releasing the decision if the applicant so requests unless the text of the decision contains no description of such subject matter. Other reasons presented will be duly considered.] See § 2.27 for trademark applications.

§ 1.52 *Language, paper, writing, margins.*

(a) The specification and oath or declaration must be in the English language ►except as provided in § 1.69◄. All papers which are to become a part of the permanent records of the Patent and Trademark Office must be legibly written or printed in permanent ink or its equivalent in quality. All of the application papers must be presented in a form having sufficient clarity and contrast between the paper and the writing or printing thereon to permit the production of readily legible copies in any number by use of photographic, electrostatic, photooffset, and microfilming processes. If the papers are not of the required quality, substitute typewritten or printed papers of suitable quality may be required.

* * * * *

§ 1.56 ►*Duty of disclosure ; striking of*◄ [*Improper*] *applications.*

►(a) A duty to disclose information to the Patent and Trademark Office rests on the inventor, each of the attorneys or agents who prepares or prosecutes the application, and every other individual who is involved in the preparation or prosecution of the application and who is associated with the inventor, the assignee or anyone to whom there is an obligation to assign the application. All such individuals have a duty to disclose to the Office information they believe to be relevant to the patentability of the claimed invention, i.e., information that might reasonably be expected to affect the decision of the examiner. The duty is commensurate with the degree of involvement in the preparation or prosecution of the application.◄

►(b)◄ Any application [signed or sworn to in blank, or without actual inspection by the applicant, and any application altered or partly filled in after being signed or sworn to, and also any application fraudulently filed or in connection with which any fraud is practiced or attempted on the Patent and Trademark Office,] may be stricken from the files ►if :

(1) Signed or sworn to in blank, or without actual inspection by the applicant ;

(2) Altered or partly filled in after being signed or sworn to ; or

(3) Any fraud or inequitable conduct is practiced or attempted on the Office in connection with it, including any violation of the duty of disclosure.◄

►(c) In order for an application to be stricken for failure to comply with the duty of disclosure, it must be established by clear and convincing evidence that :

(1) Information was withheld which might reasonably be expected to affect a decision of the Office on patentability ; and

(2) The withholding was deliberate or grossly negligent.◄

§ 1.65 *Statement of applicant.*

(a) (1) The applicant, if the inventor, must state that he verily believes himself to be the original and first inventor or discoverer of the process, machine, manufacture, composi-

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[9] Watson v. Bruns, 239 F.2d, 948, 111 USPQ 325 (D.C. Cir. 1956).

[10] Id.

[11] See In re Crowell, 17 CCPA 1009, 39 F.2d 681, 5 USPQ 84 (1930). See also In re Forstrom, 27 CCPA 1160, 111 F.2d 181, 45 USPQ 343 (1940), and In re Kirschbraun, 18 CCPA 735, 44 F.2d 675, 7 USPQ 132 (1930), for direct review of Board's decision on claims presented for the first time before the Board.

[12] E.g., Album Graphics, Inc. v. Ivy Hill Lithograph Corp., 378 F. Supp. 705, 709–10, 181 USPQ 321, 324–25 (S.D.N.Y. 1973).

tion of matter, or improvement thereof, for which he solicits a patent; that he does not know and does not believe that the same was ever known or used in the United States before his invention or discovery thereof, and shall state of what country he is a citizen and where he resides and whether he is a sole or joint inventor of the invention claimed in his application. In every original application the applicant must distinctly state that to the best of his knowledge and belief the invention has not been in public use or on sale in the United States more than one year prior to his application or patented or described in any printed publication in any country before his invention or more than one year prior to his application, or patented or made the subject of an inventor's certificate in any foreign country prior to the date of his application on an application filed by himself or his legal representatives or assigns more than twelve months prior to his application in this country. ►He must acknowledge a duty to disclose information that he believes relevant to the patentability of the invention.◄ He shall state whether or not any application for patent or inventor's certificate on the same invention has been filed in any foreign country, either by himself, or his legal representatives or assigns. If any such application has been filed, the applicant shall name the country in which the earliest such application was filed, and shall give the day, month, and year of its filing; he shall also identify by country and by day, month, and year of filing, every such foreign application filed more than twelve months before the filing of the application in this country.

(2) * * *

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►§ 1.69 *Foreign language oaths and declarations.*◄

►(a) Whenever an individual making an oath or declaration cannot understand English, the oath or declaration must be in a language that such individual can understand and shall state that such individual understands the content of any documents to which the oath or declaration relates.◄

►(b) Unless the text of any oath or declaration in a language other than English is a form provided or approved by the Patent and Trademark Office, it must be accompanied by a verified English translation, except that in the case of an oath or declaration filed under § 1.65, the translation may be filed in the Office no later than two months after the filing date.◄

►PATENTABILITY STATEMENT◄

§ 1.97 *Filing of patentability statement.*

►(a) At the time of filing the application or within two months thereafter, there shall be filed a patentability statement. The statement must be separate from the specification but may refer to matter contained in the specification.◄

►(b) The examiner will decline to examine any application in which the statement is defective or has not been filed. If a statement has been filed but is defective, the applicant will be given an opportunity to submit an amended statement. If no statement has been filed within two months after filing the application, the applicant may submit one later, provided the failure to file has been inadvertent and there is presented an adequate explanation of why it was not submitted earlier.◄

►(c) The statement shall not be construed as a representation that a search has been made or that no better art exists than that which has been considered. This section does not impose an obligation to make any search of patents, publications or other information outside the knowledge of the individuals who have a duty of disclosure under § 1.56.◄

►§ 1.98 *Content of patentability statement.*◄

►(a) The statement shall include: (1) A listing of the relevant patents, publications or other information, if any, considered by the applicant and/or any attorney or agent during preparation of the application; (2) a copy of at least the pertinent portion of each listed patent or publication; and (3) a concise explanation of the reasons why the claimed invention is believed patentable over the patents, publications or other information which applicant considers most relevant. If no such information was considered, the statement shall so state. By "relevant" information is meant that which might reasonably be expected to affect the decision of the examiner.◄

►(b) When two or more patents or publications considered relevant are substantially identical, a copy of a representative one may be included in the statement and others merely listed. A translation of the pertinent portions of foreign language patents or publications considered relevant should be transmitted if an existing translation is readily available to the applicant.◄

►(c) Information cited or referred to by the examiner or applicant in a parent application must be included in the statement if considered relevant.◄

►§ 1.99 *Updating of patentability statement.*◄

►If an applicant, attorney or agent learns of additional relevant patents, publications or other information after filing the patentability statement and prior to issuance of a patent, the additional information shall be submitted to the examiner promptly, together with the explanation and copies required by § 1.98. This material may be incorporated into other papers or amendments being submitted to the examiner concurrently.◄

►§ 1.109 *Reasons for allowance.*◄

►If the examiner believes his reasons for allowing claims in an application will not be apparent from other papers of record, he may notify the applicant of the reasons for allowance. Such reasons may be incorporated into an Office action rejecting other claims of the application or may be the subject of a separate communication to the applicant. The applicant may file a statement commenting on the reasons for allowance within such time as may be specified by the examiner.◄

§ 1.175 *Reissue oath or declaration.*

(a) Applicants for reissue, in addition to complying with the requirements of the first sentence of § 1.65, must also file with their applications a statement under oath or declaration as follows:

(1) ►When the◄ [That] applicant verily believes the original patent to be wholly or partly inoperative or invalid, ►stating such belief◄ and the reasons why.

(2) When it is claimed that such patent is so inoperative or invalid "by reason of a defective specification or drawing," particularly specifying such defects.

(3) When it is claimed that such patent is inoperative or invalid "by reason of the patentee claiming more or less than he had a right to claim in the patent," distinctly specifying the excess or insufficiency in the claims.

►(4) When the applicant is aware of prior art or other information relevant to patentability, not previously considered by the Office, which might cause the examiner to deem the original patent wholly or partly inoperative or invalid, particularly specifying such prior art or other information and requesting that if the examiner so deems, the applicant be permitted to amend the patent and be granted a reissue patent.◄

►(5)◄ [(4)] Particularly specifying the errors ►or what might be deemed to be errors◄ relied upon, and how they arose or occurred.

►(6) Stating that◄ [(5) That] said errors ►, if any,◄ arose "without any deceptive intention" on the part of the applicant.

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§ 1.194►*Oral*◄ *Hearing.*

►(a) An oral hearing should be requested only in those circumstances in which the appellant considers such a hearing necessary or desirable for a proper presentation of his appeal. An appeal decided without an oral hearing will receive the same consideration by the Board of Appeals as appeals decided after oral hearing.◄

►(b) If appellant requests an oral hearing, an oral argument may be presented by, or on behalf of, the primary examiner if considered desirable by either the primary examiner or the Board.◄

►(c)◄ If no request for oral hearing has been made by the appellant, the appeal will be assigned for consideration and decision. If the appellant has requested an oral hearing, a day of hearing will be set, and due notice thereof given to the appellant. Hearing will be held as stated in the notice, and oral argument will be limited to [one-half hour] ►twentey minutes each for the appellant and for the primary examiner◄ unless otherwise ordered before the hearing begins.

§ 1.196 *Decision by the Board of Appeals.*

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(b) ►Although the Board of Appeals normally will confine its decision to a review of rejections made by the primary examiner, should it◄ [Should the Board of Appeals] have

knowledge of any grounds not involved in the appeal for rejecting any appealed claim, ►or knowledge of any grounds for rejecting any allowed claim,◄ it may include in its decision a statement to that effect with its reasons for so holding, which statement shall constitute a rejection of the claims. The appellant may submit an appropriate amendment of the claims so rejected or a showing of facts, or both, and have the matter reconsidered by the primary examiner. The statement shall be binding upon the primary examiner unless an amendment or showing of facts not previously of record be made which, in the opinion of the primary examiner, avoids the additional ground for rejection stated in the decision. The applicant may waive such reconsideration before the primary examiner and have the case reconsidered by the Board of Appeals upon the same record before them. Where request for such reconsideration is made the Board of Appeals shall, if necessary, render a new decision which shall include all grounds upon which a patent is refused. The applicant may waive reconsideration by the Board of Appeals and treat the decision, including the added grounds for rejection given by the Board of Appeals, as a final decision in the case.

* * * * *

§ 1.291 *Protests* ►*and prior art citations by public*◄ [*to the grant of a patent.*]

►(a)◄ The patent statutes do not ►prohibit◄ [provide for] opposition to the grant of a patent on the part of the public. [Protests to the grant of a patent are ordinarily merely acknowledged, and filed after being referred to the examiner having charge of the subject matter involved for his information.] ►A protest to the grant of a patent specifically identifying the application to which the protest is directed will be entered in the application file, and if timely submitted and accompanied by a copy of any prior art documents relied upon will be considered by the examiner.◄

►(b) Citations of prior art may be entered in the patent file after a patent has been granted, at the request of a member of the public or the patentee. Such citations will be entered without comment by the Patent and Trademark Office.◄

►(c) Protests and prior art citations by the public, and any accompanying papers or exhibits, should either (1) reflect that a copy of the same has been served upon the applicant or patentee or his attorney or agent of record; or (2) be filed in duplicate in the event service is not possible.◄

§ 1.292 *Public use proceedings.*

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(b) The petition and accompanying papers should [be filed in duplicate, or served upon the applicant, his attorney or agent of record, and petitioner should offer to bear any expense to which the Office may be put in connection with the proceeding] ►either (1) reflect that a copy of the same has been served upon the applicant, his attorney or agent of record; or (2) be filed in duplicate in the event service is not possible. The petition and accompanying papers, or a notice that such a petition has been filed, shall be entered in the application file.◄

§ 1.346 *Signature and certificate of attorney.*

Every paper filed by an attorney or agent representing an applicant or party to a proceeding in the Patent and Trademark Office must bear the signature of such attorney or agent, except papers which are required to be signed by the applicant or party in person (such as the application itself and affidavits or declarations required of applicants). The signature of an attorney or agent to a paper filed by him, or the filing or presentation of any paper by him, constitutes a certificate that the paper has been read; that its filing is authorized; that to the best of his knowledge, information, and belief, there is good ground to support it ►(including good ground to support any assertion of improper conduct under § 1.56)◄; and that it is not interposed for delay.

Dated: September 17, 1976.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Approved: September 28, 1976.

BETSY ANCKER-JONSON,
Assistant Secretary for Science and Technology.

[FR Doc.76-28916; Filed 10-1-76; 8:45 am]

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,828,909, Sollenberger and Faxon, PARKING METER, **filed** May 27, 1975, D.C.N.J. (Newark) Doc. 75–896, *Qonaar Corporation* v. *Time Mechanisms, Inc. and Henry R. Stiffel.*

2,847,995, J. Q. Adams, TRANSFUSION NEEDLE SHEATH; **3,469,572**, J. R. Nehring, APPARATUS FOR TAKING MULTIPLE FLUID SAMPLES; **3,494,352**, Russo and Halligan, APPARATUS FOR TAKING MULTIPLE SAMPLES, **filed** July 23, 1970, D.C.N.J. (Newark) Doc. 987–70, *Johnson & Johnson* v. *Becton, Dickinson & Co.* Order of dismissal of action, Nov. 7, 1975.

2,906,875, E. T. Molinaro, STATION SAMPLING RADIO, **filed** June 29, 1972, D.C., S.D.N.Y., Doc. 72–C–2786, *Edward T. Molinaro and Anthony P. Catanzaro* v. *General Electric Company.* Pursuant to Rule 41(a)(ii), action is dismissed without prejudice, Apr. 15, 1975. **Same, filed** Apr. 21, 1975, D.C. Del. (Wilmington), Doc. 75–103, *Edward T. Molinaro and Anthony P. Catanzaro* v. *Radio Corporation of America, Motorola, Inc. and Midland Corp.* **Same, filed** June 19, 1975, D.C. Del. (Wilmington) Doc. 75–169, *Edward T. Molinaro and Anthony P. Catanzaro* v. *Rockwell International et al.* **Same, filed** Mar. 20, 1975, D.C., E.D. Pa. (Philadelphia) Doc. 75–847, *Edward T. Molinaro* v. *American Telephone and Telegraph Company.* **Same, filed** June 11, 1976, D.C., S.D.N.Y., Doc. 76–C–2582, *Edward T. Molinaro* v. *Sears, Roebuck and Company.* **Same, filed** June 11, 1976, D.C., S.D.N.Y., Doc. 76–C–2583, *Edward T. Molinaro* v. *Schlumberger, Ltd.*

3,040,136, J. F. Grado, ELECTRO-MECHANICAL TRANSDUCER, **filed** May 26, 1976, D.C., S.D.N.Y., Doc. 76–C–2369, *Joseph F. Grado* v. *Ortofon, Inc.*

3,161,460, E. Huber, SPRAYING UNIT, **filed** Aug. 12, 1975, D.C. Md. (Baltimore) Doc. 75–1110, *Bristol-Myers Company et al.* v. *Dart Drug Corporation.*

3,218,442, Waitman, Fesperman and Beazley, INFORMATION RECORDING DEVICE, **filed** May 24, 1976, D.C.N.J. (Trenton) Doc. C–76–959, *General Foods Corporation* v. *Computer Election Systems, Inc. et al.*

3,246,336, Baribo, Porter, Turner and Wright, MOLASSES FEED BLOCKS AND METHOD OF PREPARATION AND USE, **filed** June 2, 1976, D.C., N.D. Tex. (Forth Worth) Doc. CA–4–76–157, *A. E. Staley Manufacturing Company* v. *Vit-A-Way, Inc.*

3,264,383, Niessner, Sonnleitner, Wolf and Gutibuber, EXTRUSION METHODS, **filed** June 23, 1975, D.C., M.D. Ga. (Macon) Doc. C.A. 75–28–Thom, *Kunststoffwerk Gebruder Anger GmbH & Co. Munchen*, v. *Davis Water & Waste Industries, Inc.*

3,424,496, W. A. Prough, VEHICLE PASSENGER SAFETY DEVICES, **filed** Jan. 6, 1975, D.C. Del. (Wilmington) Doc. 75–2, *Wendell Arthur Prough* v. *General Motors Corporation.*

3,463,651, R. Warsager, MULTICOLOR SURFACE DECORATION AND PROCESS FOR PRODUCING SAME, **filed** Apr. 9, 1975, D.C.N.J. (Newark) Doc. 75–578, *Rubin Warsager* v. *Dri-Print Foils, Inc.*

3,469,572. (See 2,847,995.)

3,494,352. (See 2,847,995.)

3,519,879, F. T. Ogawa, FLASH APPARATUS WITH AUTOMATIC LIGHT TERMINATION HAVING GATING AND ANTICIPATION MEANS, **filed** Jan. 24, 1973, D.C., N.D. Ill. (Chicago) Doc. 73c215, *Honeywell, Inc.* v. *Matsushita Electric Industrial Co., Ltd., Ponder & Best, Inc., and Camera Exchange, Inc.* The complaint of plaintiff is dismissed with prejudice as to all defendants, and the counterclaim of defendants, Matsushita Electric Industrial Co., Ltd. and Ponder & Best Inc. is dismissed with prejudice, Nov. 11, 1974.

3,523,402, West and Henchman, APPARATUS FOR BANDING TUBES, **filed** July 28, 1971, D.C., M.D. Pa. (Scranton) Doc. 71–313–C, *Cleo Wrap Corporation* v. *Elsner Engineering Works, Inc.* Consent judgment order—plaintiff's complaint for infringement of Claims 1 and 2 is dismissed with prejudice; defendant's counterclaim for a declaratory judgment holding said patent invalid and not infringed, and defendant's counterclaim charging plaintiff with acts of unfair competition is dismissed with prejudice, Mar. 25, 1974.

3,524,613, Reuter, Vickery and Everett, FLEXIBLE GLIDING WING, **filed** May 20, 1976, D.C.N.J. (Camden) Doc. 76–0932, *Pioneer Parachute Co. Inc.* v. *Para-Flite, Inc.*

3,529,406, Allan, Jr. and Fink, FILTER FRAME SEAL; **Re. 27,701,** same, **filed** Aug. 8, 1975, D.C.S.C. (Columbia) Doc. 75–1890, *Flanders Filters, Inc.* v. *Westinghouse Electric Corp., Sifco Industries, Inc. and HEPA Corporation.*

3,689,968, R. G. Truxillo, METHOD OF ALIGNING BEARINGS OF SHAFTING SYSTEMS, **filed** Aug. 29, 1975, D.C., E.D. La. (New Orleans) Doc. 75–2738, *Philadelphia Resins Corp.* v. *Tru-Line, Inc.*

3,696,813, R. M. Wallach, CRYOSURGICAL INSTRUMENT, **filed** May 13, 1974, D.C., E.D. Pa. (Philadelphia) Doc. 74–1202, *Cryomedics Inc.* v. *Keeler Optical Products Inc.* **Same, filed** Dec. 13, 1974, D.C. Conn. (Bridgeport) Doc. B–74–453, *Cryomedics, Inc.* v. *Spembly, Limited and Spembly Technical Products Limited.*

3,696,952, B. A. Bodenheimer, BULK CARGO HANDLING SYSTEM AND METHOD, **filed** May 20, 1976, D.C., S.D. Ga. (Savannah) Doc. CV 476–128, *Sea-Land Services, Inc.* v. *United States Lines, Inc.*

3,722,002, J. Charnley, ACETABULAR SOCKETS, **filed** Mar. 10, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c762, *Codman & Shurtleff, Inc., Chas. F. Thackray Limited* v. *Howmedica, Inc.* Defendant's motion to transfer granted. Cause transferred to U.S.D.C. for the district of New Jersey pursuant to Title 28 U.S.C. Section 1404(a), June 25, 1975. **Same, filed** July 14, 1975, D.C.N.J. (Newark) Doc. 75–1223, *Codman & Shurtleff, Inc. et al.* v. *Howmedica, Inc.*

3,727,475, W. W. Steil, PULLEY-AND-SHAFT ASSEMBLY FOR ROTARY LAWN MOWERS AND METHOD OF MANUFACTURING THE SAME, **filed** Mar. 6, 1975, D.C., E.D. Wis. (Milwaukee) Doc. 75–112, *Production Stamping Corporation* v. *Capitol Stampings Corporation.* Stipulation of the parties to dismiss action, including counterclaim, Feb. 19, 1976.

3,732,633, Margolis and Saunders, SLIDING PANEL DISPLAY, **filed** May 29, 1975, D.C., S.D.N.Y., Doc. 75–2533, *Ply-Gem Industries, Inc.* v. *Conklin & Strong, Inc.*

3,737,513, Constant, Jr., Hodge, Barker and Keller, DYNAMIC ADVERTISING DISPLAY SYSTEM, **filed** Sept. 4, 1975, D.C., M.D. Fla. (Tampa) Doc. 75–637–C–T–K, *Freeport Minerals Company* v. *Uranium Recovery Corporation.*

3,756,298, R. F. West, HANDSAW, **filed** May 28, 1976, D.C. Conn. (Hartford) Doc. 76–218, *The Stanley Works* v. *Consolidated Foods Corp.*

3,767,339, D. B. Hunkar, INJECTION MOLDING CONTROL, **filed** Apr. 29, 1975, D.C., N.D. Ohio (Cleveland) Doc. C75–379, *Hunkar Laboratories, Inc.* v. *Van Dorn Company.*

3,789,210, Weber, Shroyer and Baker, RECESSED LIGHTED ASSIST BAR, **filed** July 3, 1974, D.C., C.D. Calif. (Los Angeles) Doc. 74–1857–FW, *Progressive Dynamics, Inc.* v. *Building Components Inc.*

3,813,537, G. Lieberman, LAMPSHADE AND LAMP COMBINATION AND MEANS FOR JOINING ONE WITH THE OTHER, **filed** June 25, 1974, D.C. Md. (Baltimore) Doc. N–74–657, *Softlite, Inc.* v. *Southeast Zayre, Inc.* v. *Stylette Plastics, Inc.* Stipulation of counsel dismissing complaint and counterclaim, Apr. 28, 1975.

3,816,958, E. A. Winston, WHEEL DRIVE TOY, **filed** June 2, 1976, D.C. Minn. (St. Paul) Doc. C–76–192, *Emanuel A. Winston* v. *Warren Gochenhouse, individually and doing business as Telmont Corporation.*

3,864,768, Fraige and Reed, WATER MATTRESS WITH INTERNAL FLOAT TUBE, **filed** May 27, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV 76–1717–DWW, *Dyna-Clean, Inc.* v. *Richard Fragie et al.*

3,871,585, Crossman, Kenrick and LeMieux, AIR BED, **filed** Mar. 18, 1975, D.C., S.D.N.Y., Doc. 75–C–1332, *Ideal Toy Corp.* v. *Brunswick Corp.*

3,877,266, Cody and Sites, MOWING MACHINE, **filed** Sept. 18, 1975, D.C., M.D. Fla. (Orlando) Doc. 75–308–Orl., *Cosmos Futura, Inc. et al.* v. *Tresca Industries, Inc.*

3,929,049, C. L. Graversen, EXTENDED PITCH SAW CHAIN, **filed** May 27, 1976, D.C. Oreg. (Portland) Doc. C–76–496, *Omark Industries, Inc.* v. *Textron, Inc.*

Re. 27,701. (See 3,529,406.)

D. 206,286, J. J. Ostyn, FLUORESCENT LIGHTING FIXTURE OR SIMILAR ARTICLE, **filed** July 1, 1974, D.C.N.J. (Newark) Doc. 74–986, *American Lighting Corp.* v. *Bernard McRonald, individually and trading as National Illuminating Company.* Order of dismissal of action, July 14, 1975.

D. 217,038, J. H. Cleave, IDENTIFICATION MARKER FOR AUTOMOBILES OR THE LIKE, **filed** Feb. 21, 1973, D.C., C.D. Calif. (Los Angeles) Doc. 73–391–JWC, *John H. Cleaves* v. *Harold Reed, doing business as Reed Enterprises.* Filed judgment by consent and stipulation and order thereon permanently enjoining defendant from infringing plaintiff's Letters Patent, entered May 15, 1974.

D. 230,353, P. J. Mochel, AUTOMOBILE WHEEL, **filed** July 23, 1974, D.C., C.D. Calif. (Los Angeles) Doc. CV–74–2088–R, *W. R. Grace & Co.* v. *Western U.S. Industries, Inc.* Filed judgment upon defendant's motion for direct verdict and order thereon that plaintiff is owner of said patent, that said patent is invalid and void, therefor the complaint is dismissed with prejudice, entered May 16, 1975. **Same, filed** July 23, 1974, D.C., C.D. Calif. (Los Angeles) Doc. CV–74–2089–RF, *W. R. Grace & Co.* v. *E-T Industries, Inc. and Pyramid Enterprises.* Filed judgment and order thereon dismissing complaint with prejudice, that said patent is invalid, entered May 16, 1975.

PATENT NOTICES

Certificates of Correction for the Week of Oct. 26, 1976

Re. 28,668	3,933,197	3,960,705	3,970,285
Re. 28,703	3,934,069	3,960,752	3,970,405
Re. 28,863	3,934,831	3,960,785	3,970,429
D. 238,382	3,936,917	3,961,021	3,970,507
D. 240,758	3,937,325	3,961,178	3,970,517
D. 240,829	3,937,847	3,961,188	3,970,658
3,621,659	3,938,962	3,961,460	3,970,701
3,625,694	3,939,162	3,961,647	3,970,753
3,673,614	3,940,043	3,961,897	3,970,840
3,675,519	3,940,122	3,962,101	3,971,127
3,697,440	3,940,125	3,962,102	3,971,175
3,702,366	3,940,186	3,962,147	3,971,369
3,703,563	3,940,495	3,962,297	3,971,525
3,719,455	3,940,752	3,962,397	3,971,786
3,762,156	3,944,045	3,963,390	3,971,866
3,784,479	3,944,306	3,963,503	3,971,926
3,794,844	3,945,393	3,963,677	3,971,941
3,799,943	3,947,370	3,963,909	3,971,946
3,804,905	3,948,758	3,963,937	3,972,233
3,805,139	3,948,988	3,964,386	3,972,297
3,815,354	3,949,010	3,964,457	3,972,451
3,822,105	3,949,632	3,964,911	3,972,453
3,829,469	3,949,806	3,965,106	3,972,598
3,830,839	3,950,333	3,965,116	3,972,607
3,832,383	3,950,807	3,965,140	3,972,665
3,841,950	3,951,781	3,965,628	3,972,703
3,846,158	3,952,205	3,965,972	3,972,820
3,847,273	3,952,698	3,966,057	3,972,909
3,847,639	3,953,127	3,966,283	3,973,006
3,855,040	3,953,496	3,966,341	3,973,071
3,855,211	3,953,534	3,966,638	3,973,230
3,860,671	3,954,028	3,966,733	3,973,370
3,862,969	3,954,245	3,966,795	3,973,545
3,865,184	3,954,329	3,966,819	3,973,556
3,870,537	3,954,414	3,966,884	3,973,557
3,873,333	3,954,501	3,966,886	3,973,977
3,882,138	3,954,828	3,966,952	3,974,007
3,894,782	3,955,348	3,966,956	3,974,214
3,899,369	3,955,671	3,966,969	3,974,267
3,901,920	3,955,812	3,966,970	3,974,327
3,903,485	3,956,154	3,966,988	3,974,470
3,905,839	3,956,306	3,967,011	3,974,562
3,908,052	3,957,310	3,967,207	3,974,666
3,911,750	3,957,326	3,967,369	3,974,724
3,914,297	3,957,514	3,967,819	3,974,991
3,915,089	3,957,621	3,967,826	3,975,384
3,916,327	3,957,922	3,968,070	3,975,512
3,918,644	3,958,053	3,968,312	3,975,719
3,919,860	3,958,459	3,968,598	3,975,788
3,921,844	3,958,734	3,968,600	3,976,244
3,922,289	3,958,898	3,968,792	3,976,360
3,923,268	3,959,022	3,968,943	3,976,459
3,924,689	3,959,177	3,968,956	3,976,507
3,926,938	3,959,181	3,968,958	3,976,993
3,927,571	3,959,362	3,969,017	3,977,041
3,928,878	3,959,388	3,969,092	3,977,225
3,929,632	3,959,460	3,969,230	3,977,431
3,930,985	3,959,663	3,969,663	3,978,056
3,931,167	3,960,063	3,969,737	3,978,218
3,932,629	3,960,110	3,970,079	3,978,235

Patents Available for Licensing or Sale

The following 2 patents are offered by: E. W. Garrison, P.O. Box 536, Cave Creek, Ariz., 85331.

3,811,224. PET DOOR PANEL.

3,830,202. PET PULL TOY.

3,484,953. APPARATUS FOR SIMULATING FREE FALL THROUGH AIR. Ray H. Norheim, Jr., 110 Loma Seca Road, Thousand Oaks, Calif., 91360.

3,892,407. MAGNETIC RING TOSS APPARATUS. Edward Higgins, 155 West White St., Sumit, Hill, Pa., 18250.

3,872,610. MATHEMATICS TEACHING APPARATUS. Matt J. Dumovich, 2151 Illion St., San Diego, Calif., 92110.

3,900,023. SUPPORT AND EXCITER DEVICE. Ralph J. McBride, 6200 Marinette, Apt. 913, Houston, Tex., 77036.

3,966,157. HEAVY WEIGHT HANGER. Jose Corral, Apt. F-64, Pepper Tree Village, Imperial Blvd., Lakeland, Fla., 33803.

3,237,885. SPACE CRAFT. Jack L. Mohar, 41 W. Arbor St., Long Beach, Calif., 90805.

3,899,157. TACK FASTENER STRIPPER. Robert Thomas, 30 W. Chicago Ave., Chicago, Ill., 60610.

3,964,437. DOG TOILET. Kenneth J. Brown, 39 Blackford Ave., Yonkers, N.Y., 10704.

3,970,268. REEL COMPRISING REEL HALVES. George A. Sheetz. Correspondence to: Larry Harold Kline, Suite 805, 18 Broad St., Charleston, S.C., 29401.

3,970,267. REEL WITH INTERCHANGEABLE PARTS. George A. Sheetz. Correspondence to: Larry Harold Kline, Suite 805, 18 Broad St., Charleston, S.C., 29401.

3,949,559. PROCESS FOR ISOLATING AQUEOUS BRINE LAYERS IN UNDERGROUND GAS-STORAGE CAVERNS. Bergwerksverband GmbH, Germany. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y., 10017.

3,946,144. SEALED CABLE JUNCTION. Wilhelm Quante Spezialfabrik fur Apparate de Fernmeldetechnick Wuppertal, Germany. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y.,10017.

3,704,008. PASSIVE MEANS TO REAREATE FLOWING BODIES OF WATER. Charles Thomas Ziegler, 9842 W. 13th St., Santa Ana, Calif., 93927.

3,950,452. POLYURETHANE HIGH-VOLTAGE INSULATOR APPLIANCE. Dr. Beck & Co. AG, Germany. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y., 10017.

3,920,098. PRESSURIZED LUBRICATING SYSTEM FOR RECIPROCATING COMPRESSOR DRIVE. Walter Schroeder, 6 South Coria, Brownsville, Tex., 78520.

3,969,610. LIQUID HEATING DEVICE. Helen and Charles Ratti, One Ann Court, North Babylon, N.Y., 11703.

3,979,777. SWIM HELMET. Frank M. Gregg. 520 N. 52nd St., Philadelphia, Pa., 19131.

3,945,055. TOILET FLUSHING RESERVOIR. Bennie L. Hollars and Arnold E. Hollars, 2309 Walnut Ave., Carmichael, Calif., 95608.

Eastman Kodak Company announces that, in accordance with its policy, nonexclusive licenses on reasonable terms are available under the 22 patents listed below.

Eastman Kodak Company also announces that is practice generally is to grant nonexclusive licenses under unexpired U.S. patents issued to Kodak prior to 1971, on photographic inventions and on inventions made in the course of research and development work for the U.S. government.

Inquiries regarding the availability of such licenses may be addressed to Director, Corporate Commercial Affairs, Eastman Kodak Company, 343 State St., Rochester, N.Y., 14650.

3,613,541. GEAR DRIVE FOR A CAMERA AND FILM CARTRIDGE.

3,680,954. ELECTROGRAPHY.

3,709,128. FILM METERING MECHANISM.

3,712,200. FILM CREEP PREVENTING MEANS FOR CAMERAS.

3,724,348. MEANS FOR PREVENTING FILM MOVEMENT IN A CAMERA.

3,728,949. GEAR DRIVE FOR A CAMERA AND FILM CARTRIDGE.

2,730,066. FILM MOVEMENT PREVENTION MEANS.

3,732,794. CAMERA BODY RELEASE LEVER MECHANISM.

3,736,854. FILM METERING MECHANISM FOR CAMERAS.

3,747,494. FILM ADVANCE AND METERING MECHANISM FOR CAMERAS.

3,748,991. DEVICE FOR PREVENTING FILM MOVEMENT IN STILL CAMERAS.

3,750,545. FILM METERING DEVICE FOR ROLL FILM CAMERAS.

3,756,134. FILM MOVEMENT PREVENTING MEANS FOR STILL CAMERAS.

3,757,658. FILM METERING MECHANISM FOR CAMERAS.

3,774,513. DEVICE FOR PREVENTING FILM MOVEMENT IN CAMERAS.

3,779,145. FILM MOVEMENT PREVENTING MEANS FOR CAMERAS.

3,806,243. SHROUD FOR SOUND MOTION PICTURE CAMERA.

3,822,248. 1-HYDROXY - 4 - (PENTAFLUOROPHENOXY) - N - {β-[4-[α-(2,4-DI-t-AMYLPHENOXY)ACETAMIDO]PHENYL)ETHYL} - 2 - NAPHTHAMIDE.

3,825,327. SOUND MOTION PICTURE CAMERA.

3,833,380. NOVEL PHOTOGRAPHIC ELEMENTS.

3,860,195. DISABLING DEVICE FOR AN ANTI-BACKUP MECHANISM IN A FILM CARTRIDGE.

3,880,504. PRESSURE RELIEF MECHANISM.

Nalco Chemical Company is prepared to grant nonexclusive licenses on the following 26 patents on reasonable terms to all manufactures and users.

Application for license under the following patents may be addressed to: Nalco Chemical Company, Patent & Licensing Department, 2901 Butterfield Road, Oak Brook, Ill., 60521, Attn.: John G. Premo.

Re. 28,474. PROCESS FOR RAPIDLY DISSOLVING WATER-SOLUBLE POLYMERS.

Re. 28,576. PROCESS FOR RAPID DISSOLVING WATER-SOLUBLE VINYL ADDITION POLYMERS USING WATER-IN-OIL EMULSIONS.

3,624,019. PROCESS FOR RAPIDLY DISSOLVING WATER-SOLUBLE POLYMERS.

3,721,295. SECONDARY RECOVERY OF PETROLEUM.

3,724,547. INVERTED LATEX WATER FLOODING METHOD.

3,724,551. SECONDARY RECOVERY OF PETROLEUM.

3,734,873. RAPID DISSOLVING WATER-SOLUBLE POLYMERS.

3,746,509. GAS CHROMATOGRAPHY ANALYSIS OF POLYMER.

3,755,259. POLYMERIC LATICES AND SODIUM ALUMINATE.

3,767,629. USE OF AIR TO CONTROL POLYMERIZATION OF WATER-SOLUBLE MONOMERS.

3,779,316. SECONDARY RECOVERY OF PETROLEUM.

3,780,806. INVERTED MIXED LATEX FOR WATER FLOODING.

3,790,476. LATICES FOR INDUSTRIAL WASTE COAGULATION.

3,790,477. LATICES FOR SEWAGE COAGULATION.

3,799,902. POLYMERIC LATICES AND SODIUM ALUMINATE.

3,806,485. STABLE LIQUID DISPERSIONS OF WATER-SOLUBLE POLYMERS AND PRODUCTS PRODUCED THEREFROM.

3,826,771. STABLE HIGH SOLIDS WATER-IN-OIL EMULSIONS OF WATER-SOLUBLE POLYMERS.

2,832,229. METHOD OF USING LATEX POLYMER FORMULATIONS FOR SEEPAGE CONTROL.

3,833,502. METHOD FOR IMPROVING THE ADHERENCE OF METALWORKING COOLANTS TO METAL SURFACES.

3,836,088. METHOD OF EXTINGUISHING OIL AND GAS WELL FIRES.

3,867,330. BRINES CONTAINING WATER-SOLUBLE ANIONIC VINYL ADDITION POLYMER AND WATER-SOLUBLE CATIONIC POLYMER.

3,902,958. METHOD OF MAKING IMPROVED PAPER AND PAPER PRODUCTS.

3,915,920. STABILIZED WATER-IN-OIL EMULSIONS UTILIZING MINOR AMOUNTS OF OIL-SOLUBLE POLYMERS.

3,920,599. LATICES OF DIALLYL DIMETHYL AMMONIUM CHLORIDE/ACRYLAMIDE POLYMERS.

3,923,756. THIN FILM CATALYTIC POLYMERIZATION OF WATER-IN-OIL EMULSIONS OF WATER-SOLUBLE ETHYLENICALLY UNSATURATED AMIDE MONOMERS.

3,929,088. USE OF WATER-IN-OIL EMULSIONS OF WATER-SOLUBLE VINYL ADDITION POLYMERS TO IMPROVE THE EFFICIENCY OF JET POWERED SHIPS.

The RCA Corporation offers to grant nonexclusive licenses on reasonable terms and conditions under the patents listed below.

Inquiries respecting licenses under RCA patents should be addressed to: RCA Corporation Staff Vice President, Domestic Licensing, 30 Rockefeller Plaza, New York, N.Y. 10036.

Re. 28,952. SHAPED RISER ON SUBSTRATE STEP FOR PROMOTING METAL FILM CONTINUITY.

3,972,230. DETECTING MALFUNCTION IN CYLINDERS OF INTERNAL COMBUSTION ENGINES.

3,972,463. WIRE PLACEMET FIXTURE.

3,972,533. SIGNAL PICKUP LIFTING/LOWERING APPARATUS.

3,973,057. METHOD OF PREPARING A LIQUID CRYSTAL DISPLAY.

3,973,139. LOW POWER COUNTING CIRCUITS.

3,973,178. TAPE CARTRIDGE PLAYER MECHANISM.

3,973,209. DIGITAL ARITHMETIC SYNTHESIZER PHASE LOCK LOOP WITH DIRECT DOPPLER AND FREQUENCY READOUT.

3,973,215. CURRENT MIRROR AMPLIFIER.

3,973,222. ASTABLE MULTIVIBRATOR CIRCUIT.

3,973,994. SOLAR CELL WITH GROOVED SURFACE.

3,974,411. CHANNEL PLATE ELECTRON MULTIPLIER TUBE HAVING REDUCED ASTIGMATISM.

3,974,438. APPARATUS FOR INDICATING OVER-CURRENT CONDITION IN A TRANSISTOR AMPLIFIER.

3,974,501. DUAL-MODE ADAPTIVE PARAMETER PROCESSOR FOR CONTINUOUS WAVE RADAR RANGING SYSTEMS.

3,974,514. ELECTROLUMINESCENT EDGE - EMITTING DIODE COMPRISING A LIGHT REFLECTOR IN A GROOVE.

3,974,515. IGFET ON AN INSULATING SUBSTRATE.

3,974,560. METHOD OF MAKING A BIPOLAR TRANSISTOR.

3,975,555. METHOD OF MAKING ELECTRICAL CONTACTS HAVING A LOW OPTICAL ABSORPTION.

3,975,672. POWER SUPPLY WITH MEANS TO REDUCE ON AND OFF SWITCHING TIMES OF SERIES REGULATED DEVICE.

3,976,016. OVERBED TABLE WITH LOCKING MECHANISM.

3,976,256. AUTOMATIC COIL WINDING MACHINE AND METHOD.

3,976,377. METHOD OF OBTAINING THE DISTRIBUTION PROFILE OF ELECTRICALLY ACTIVE IONS IMPLANTED IN A SEMICONDUCTOR.

3,976,867. CALCULATOR TIMER WITH SIMPLE BASE–6 CORRECTION.

3,976,875. PHOTODETECTOR FILTER STRUCTURE.

3,976,909. WIRE MESH CATHODE.

3,976,956. LASER DEVICE AND A METHOD OF FABRICATION.

3,976,996. CONVERSION OF FSK TO NRZ CODING.

3,977,239. ENGINE DIAGNOSIS FROM FREQUENCY COMPONENTS IN EXHAUST.

3,977,633. ORIENTATION SYSTEM FOR A SPIN STABILIZED SPACECRAFT.

3,977,991. MANGANESE - AND - MAGNESIUM - ACTIVATED STRONTIUM SULFIDE PHOSPHORS.

3,978,247. TRANSFER RECORDING PROCESS.

3,978,349. SWITCHING CIRCUIT.

3,978,416. FILTER WHICH TRACKS CHANGING FREQUENCY OF INPUT SIGNAL.

3,978,436. SURFACE ACOUSTIC WAVE DEVICE AND METHOD OF MAKING SAME.

3,978,451. CONTROLLING COMMUNICATIONS BETWEEN COMPUTER DEVICES OVER COMMON BUS.

3,978,508. PRESSURE SENSITIVE FIELD EFFECT DEVICE.

3,978,518. REINFORCED TRANSCALENT DEVICE.

PATENTS ISSUED TO RCA CORPORATION FOR JULY 1976

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3,967,883. LIQUID CRYSTAL DEVICES OF THE SURFACE ALIGNED TYPE.

3,968,326. TRAPEZOIDAL SMOOTH GROOVES FOR VIDEO DISC.

3,968,425. MEASURING IGNITION TIMING USING STARTER CURRENT.

3,968,492. ADAPTIVE PARAMETER PROCESSOR FOR CONTINUOUS WAVE RADAR RANGING SYSTEMS.

3,968,515. SINGLE FRAME COLOR ENCODING/DECODING SYSTEM.

3,969,578. VISUAL DISPLAY OF ULTRASONIC RADIATION PATTERN.

3,969,751. LIGHT SHIELD FOR A SEMICONDUCTOR DEVICE COMPRISING BLACKENED PHOTORESIST.

3,969,756. COLOR - PICTURE/MULTICHANNEL - SOUND RECORD AND RECORDING/PLAYBACK APPARATUS AND METHODS THEREFOR.

3,969,757. COLOR IMAGE SIGNAL PROCESSING CIRCUITS.

3,969,759. DEFECT COMPENSATION SYSTEMS.

3,969,858. EXPLOSION VENT CONSTRUCTION.

3,970,235. METHOD OF ANCHORING METALLIC COATED LEADS TO CERAMIC BODIES AND LEAD-CERAMIC BODIES FORMED THEREBY.

3,970,317. APPARATUS FOR INHIBITING A PLURALITY OF DISC RECORDS FROM BEING DISPOSED ON A TURNTABLE AND GROUNDING A DISC RECORD DISPOSED ON THE TURNTABLE.

3,970,456. METHOD FOR PREPARING A VIEWING-SCREEN STRICTURE FOR A CRT HAVING TEMPERATURE - COMPENSATED MASK-MOUNTING MEANS, INCLUDING COOLING MASK DURING EXPOSURE.

3,970,773. FREQUENCY SELECTIVE CIRCUIT FOR AUTOMATIC FREQUENCY CONTROL AND SOUND SIGNALS.

3,970,774. ELECTRONIC SIGNAL MIXER.

3,970,895. CIRCUIT FOR MAINTAINING OPERATING POINT STABILITY OF AN AMPLIFIER.

3,970,915. FAULT DETECTOR AND INTERRUPT CIRCUIT USEFUL IN A TELEVISION SIGNAL PROCESSING SYSTEM.

3,970,948. CONTROLLER GAIN SIGNAL AMPLIFIER.

3,970,998. MICROPROCESSOR ARCHITECTURE.

3,971,003. CHARGE COUPLED DEVICE IMAGER.

3,971,004. MEMORY CELL WITH DECOUPLED SUPPLY VOLTAGE WHILE WRITING.

3,971,064. VIDEO DE-PEAKING CIRCUIT IN LUMINANCE CHANNEL IN RESPONSE TO AGC SIGNAL.

3,971,067. AUTOMATIC BEAM CURRENT LIMITER.

3,972,012. APPARATUS FOR MOUNTING A DIODE IN A MICROWAVE CIRCUIT.

3,972,064. APPARATUS AND METHODS FOR PLAYBACK OF COLOR PICTURE/SOUND RECORDS.

General Motors Corporation is prepared to grant nonexclusive licenses under the following patents upon reasonable terms.

Application for license may be addressed to the Director, Patent Section, General Motors Building, 3044 West Grand Blvd., Detroit, Mich., 48202.

3,758,841. DC TO AC STATIC POWER CONVERTER WITH SHORT CIRCUIT PROTECTION.

3,758,869. TRANSFORMER COUPLED POWER SWITCH DEMODULATOR.

3,764,194. BIOCULAR MAGNIFIER.

3,742,775. STIFF BACK ROLLER CHAIN DEVICE.

3,748,110. DUCTILE CORROSION RESISTANT FOR NICKEL BASE ALLOY ARTICLES.

3,749,520. CENTRIFUGAL COMPRESSOR BLADING.

3,754,592. METHOD FOR PRODUCING DIRECTIONALLY SOLIDIFIED CAST ALLOY ARTICLES.

3,758,233. VIBRATION DAMPING COATINGS.

3,762,855. METHOD FOR BURNING CONTAMINATED FUEL.

General Electric Corporation is prepared to grant nonexclusive licenses under the following 2 patents upon reasonable terms.

Application for license may be addressed to: Division Patent Counsel, Lamp Business Division, General Electric Company, Nela Park, Cleveland, Ohio, 44112.

3,500,118. ELECTRODELESS GASEOUS ELECTRIC DISCHARGE DEVICES UTILIZING FERRITE CORES.

3,521,120. HIGH FREQUENCY ELECTRODELESS FLORESCENT LAMP ASSEMBLY.

Application for license may be addressed to the General Electric Company, Division Patent Counsel, Housewares and Audio Business Division, 1285 Boston Ave., Bridgeport, Conn., 06602.

3,878,628. STEAM IRON BAFFLING.

3,926,392. IRON MINDER.

3,930,325. STEAM IRON SOLEPLATE CONSTRUCTION.

3,942,706. STEAM IRON SOLEPLATE CONSTRUCTION.

3,949,499. REMOVABLE TANK IRON.

Applications for licenses may be addressed to the General Electric Company, Appliance Components Business Division, 1635 Broadway, Fort Wayne, Ind., 46804, Attn.: Patent Counsel.

Re. 28,705. STATOR SLOT AND WINDING ARRANGEMENTS.

3,516,627. ELECTRIC MOTOR RESILIENT MOUNTING FOR END ATTACHMENT.

3,936,240. CENTRIFUGAL-VORTEX PUMP.

3,936,706. CONTROL CIRCUIT.

3,937,922. CONTROL SYSTEM.

3,956,651. WIRE STATOR STRUCTURE.

3,961,300. THERMAL TIMER, THERMAL ACTUATOR, CONTROL SYSTEM AND CIRCUIT.

Applications for licenses may be addressed to the General Electric Company, Construction Materials Division, 101 E. Carmel Drive, Suite 205, Carmel, Ind., 46032.

3,771,469. INCINERATOR.

3,797,413. INCINERATOR.

Application for license should be addressed to Division Patent Counsel, Lamp Business Division, General Electric Company, Nela Park, Cleveland, Ohio, 44112.

3,562,609. SOLID STATE LAMP UTILIZING EMISSION FROM EDGE OF A P-N JUNCTION.

3,573,568. LIGHT EMITTING SEMICONDUCTOR CHIPS MOUNTED IN A SLOTTED SUBSTRATE FORMING A DISPLAY APPARATUS.

3,598,666. FORMATION OF JUNCTIONS IN SILICON CARBIDE BY SELECTIVE DIFFUSION OF DOPANTS.

3,609,449. VEHICLE HEADLIGHTING AND STANDBY PARKING LIGHT SYSTEM.

3,611,064. OHMIC CONTACT TO N-TYPE SILICON CARBIDE, COMPRISING NICKEL-TITANIUM-GOLD.

3,611,069. MULTIPLE COLOR LIGHT EMITTING DIODES.

3,629,670. ELECTRICAL CONTACT TO SILICON CARBIDE.

3,636,397. SINGLE-CRYSTAL SILICON CARBIDE DISPLAY DEVICE.

3,669,763. TRAVELING SOLVENT METHOD OF GROWING SILICON CARBIDE CRYSTALS AND JUNCTIONS UTILIZING YTTRIUM AS THE SOLVENT.

3,676,668. SOLID STATE LAMP ASSEMBLY.

3,684,930. OHMIC CONTACT FOR GROUP III-V P-TYPE SEMICONDUCTORS.

3,691,654. METAL FOIL LEAD MANUFACTURE.

3,696,389. DISPLAY SYSTEM UTILIZING LIGHT EMITTING DEVICES.

3,703,656. MONOLITHIC SEMICONDUCTOR DISPLAY DEVICES.

3,709,729. METHOD OF MAKING NICKEL-CHROME OHMIC CONTACT TO P-TYPE SILICON CARBIDE.

3,715,636. SILICON CARBIDE LAMP MOUNTED ON A CERAMIC OF POOR THERMAL CONDUCTIVITY.

Application for license may be addressed to the Missile & Space Division, P.O. Box 8555, Attn. Raymond H. Quist, General Electric Company, Philadelphia, Pa.

3,906,172. DIGITAL ECHO SUPPRESSOR.

3,942,067. MULTI-GUN CATHODE RAY TUBE CONVERGENCE SYSTEM.

3,959,767. DATA TRANSMISSION SYSTEM.

Application for license may be addressed to the Manager-Technology Marketing Operation, General Electric Company, 1 River Road, Building 5, Room 309, Schenectady, N.Y., 12345.

3,819,806. FACILITATED TRANSPORT OF HYDROGEN SULFIDE.

3,841,747. APPARATUS INCLUDING RANDOM ACCESS POSITIONING MEANS.

3,852,134. METHOD FOR FORMING SELECTIVELY PERFORATE BODIES.

3,852,235. MELT EXTRUDABLE POLYACETYLENE COPOLYMER BLENDS.

3,876,444. METHOD OF TREATING HIGH STRENGTH CARBON FIBERS.

3,889,672. OPEN CIRCUIT SYSTEM FOR RESPIRATION TESTING.

3,899,574. METHOD FOR MAKING GRAPHITE FIBER AND RIBBON.

3,927,555. HYDROGEN DETECTOR SYSTEM.

3,928,516. CONTINUOUS METHOD FOR MAKING SPINNABLE POLYACETYLENE SOLUTIONS CONVERTIBLE TO HIGH STRENGTH CARBON FIBER.

3,933,722. MELT EXTRUDABLE POLYACETYLENE COPOLYMER BLENDS.

3,933,957. PROCESS FOR PRODUCING SHAPED ARTICLES FROM AN ACETYLENIC POLYMER.

Union Carbide Corporation will grant a nonexclusive license for the remainder of the term of the following patent for one dollar ($1.00).

3,009,855. METHOD AND COMPOSITION OF DESTROYING INSECTS EMPLOYING 1-NAPHTHYL N-METHYL CARBAMATE.

Application for license under said patent may be addressed to:

Chief Patent Counsel
Union Carbide Corporation
270 Park Avenue
New York, N.Y. 10017

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF SEPTEMBER 25, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-21-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	1-6-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	10-20-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	12-29-75
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	5-21-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	11-10-75
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-2-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	3-29-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-15-75
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-2-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	11-12-75
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	3-8-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	12-29-75
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	9-24-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	3-8-76

Expiration of patents: The patents within the range of numbers indicated below expire during October 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,907,037 to 2,910,696, inclusive
Plant Patents..... Numbers 1,870 to 1,875, inclusive

REISSUES

OCTOBER 26, 1976

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,009

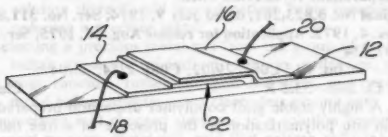
HIGH SENSITIVITY SEMICONDUCTOR STRAIN GAUGE

Frederick J. Jeffers, Escondido, Calif., assignor to Bell & Howell Company, Pasadena, Calif.

Original No. 3,805,601, dated Apr. 23, 1974, Ser. No. 276,269, July 28, 1972. Application for reissue Sept. 25, 1974, Ser. No. 509,518

Int. Cl.² G01L *1/22*

U.S. Cl. 73—88.5 SD **11 Claims**



1. A semiconductor strain transducer assembly, comprising:

a layer of piezoelectric semiconductor material of single conductivity type having a *hexagonal wurtzite crystal structure and having a* strain sensitive resistivity along [a predetermined direction, said layer being chosen from the group consisting essentially of cadmium sulfide, zinc sulfide, cadmium selenide, zinc selenide, cadmium oxide, zinc oxide, cadmium telluride, zinc telluride, aluminum nitride, gallium nitride, indium nitride, thallium nitride, aluminum phosphide, gallium phosphide, indium phosphide, thallium phosphide, aluminum arsenide, gallium arsenide, indium arsenide, thallium arsenide, aluminum antimonide, gallium antimonide, indium antimonide, thallium antimonide, and alloys thereof so that said resistivity] *its C axis which* is strain sensitive by a gauge factor of at least 100;

electrical contacts defining a current path parallel to said [predetermined direction] *C axis;*

means for applying a voltage across said electrical contacts;

means for measuring the resistance between said electrical contacts while said voltage is applied;

means for securing said layer to a member to which strain forces under investigation are to be applied; and

means for applying said strain forces under investigation to said member.

Re. 29,010

ORAL CAVITY SIZE CONTROLLED MUSICAL SOUND APPARATUS AND METHOD

Larry A. Spence, 720 Fairlane, Apt. D, Longmont, Colo. 80501

Original No. 3,730,046, dated May 1, 1973, Ser. No. 225,732, Feb. 14, 1972. Application for reissue Feb. 21, 1975, Ser. No. 551,893

Int. Cl.² G10H *3/00*

U.S. Cl. 84—1.05 **20 Claims**

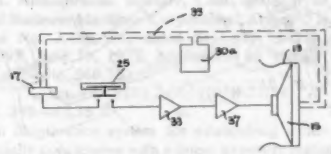
1. A mouth operated electronic musical instrument for use in forming tones comprising:

a microphone,

a loudspeaker,

amplifier means for amplifying the output of said microphone, the output of said amplifier means being fed to said loudspeaker,

means for providing an acoustical feedback path between the loudspeaker and the microphone input comprising a casing for enclosing said microphone, enclosure means for forming an enclosure with said loudspeaker, and tube means for interconnecting said casing and said enclosure means, and



a mouthpiece connected to said means for providing a feedback path.

Re. 29,011

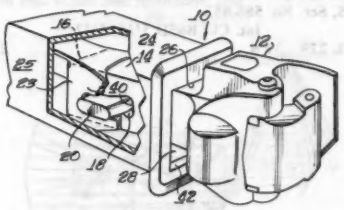
RAILWAY COUPLER SHANK KEYSLOT CONTOUR

Russell George Altherr, Munster, Ind., asignor to AMSTED Industries Incorporated, Chicago, Ill.

Original No. 3,858,729, dated Jan. 7, 1975, Ser. No. 349,995, Apr. 11, 1973. Application for reissue Mar. 31, 1975, Ser. No. 563,614

Int. Cl.² B61G *7/00*

U.S. Cl. 213—64 **3 Claims**



1. In a railway coupler shank having a longitudinal axis extending the length of said shank from front to rear, the improvement comprising; a substantially horizontal keyslot in the rear portion of said shank extending between the vertical sides and through said shank perpendicular to said longitudinal axis for receiving a key attaching said shank to a draft gear yoke and extending through a slot in the sides of a striker casing; said keyslot having spaced upper and lower surfaces, said upper surface being substantially parallel to the longitudinal axis of said coupler shank and said lower surface diverging downwardly and forwardly away from said upper surface, said upper and lower surfaces merging with forward and rear bearing surfaces.

Re. 29,012

CABLE WELDING TOOL

William E. Good, Avalon, and Arthur S. Davies, Cinnaminson, both of N.J., assignors to Kelsey-Hayes Company, Romulus, Mich.

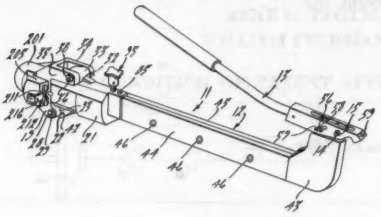
Original No. 3,800,997, dated Apr. 2, 1974, Ser. No. 217,096, Jan. 12, 1972. Application for reissue Jan. 20, 1975, Ser. No. 542,387

Int. Cl.² B23K *21/00*

U.S. Cl. 228—3.1 **21 Claims**

1. A hand held tool for cold pressure welding of pieces comprising a housing assembly adapted to be held in the hand of an operator, welding dies for gripping and upsetting the

pieces to be welded, a handle supported for movement relative to the housing assembly and adapted to be manually moved relative thereto, force amplifying means carried by said housing assembly and operatively interposed between said handle and said welding dies for amplifying the manual force



applied to said handle and for using said amplified force for moving said welding dies through a welding sequence, and means interposed between said force amplifying means and said welding dies for limiting the force applied to said welding dies by said force amplifying means.

Re. 29,013

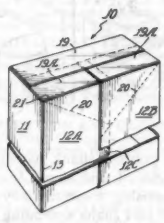
EASY PACKING DEEP CONTAINER

Tony D. Faires, Chattanooga, Tenn., and Larry M. Balkin, Decatur, Ga., assignors to Container Corporation of America, Chicago, Ill.

Original No. 3,771,714, dated Nov. 13, 1973, Ser. No. 242,625, Apr. 10, 1972. Application for reissue June 16, 1975, Ser. No. 586,852

Int. Cl.[2] **B65D** *5/16, 5/72*

U.S. Cl. 229—37 R **2 Claims**



1. An easy packing deep container made from a cut and scored blank of paperboard or the like comprising:

a. opposed pairs of main panels connected along lines of fold to define a container body;

b. one of said main panels being composed of a pair of overlapping portions secured in overlapping relationship near the edges thereof along part of the length thereof;

c. closure flaps extending from one end of said main panels and foldably connected thereto;

d. said closure flaps being folded with respect to said main panels into overlapping and secured relationship to define a bottom closure for said container body;

e. other [closure] flaps extending from opposite ends of said main panels and foldably connected thereto;

f. a score line extending in said overlapping panel portions from each edge thereof to a corner thereof adjacent one of said other [closure] flaps connected thereto to define a pair of triangular shaped subpanels.

g. said triangular shaped subpanels together with some of said other [closure] flaps being foldable along last named score lines to provide ease of loading of said container body from the open side thereof;

h. said triangular shaped subpanels being foldable back into the plane of said overlapping portions to complete the loading of said container body [;] .

[i. said other closure flaps and the remainder of said other closure flaps being foldable into overlapping and secured relationship after completion of loading of said container body.]

Re. 29,014

HIGHLY-STABLE GRAFT COPOLYMER DISPERSIONS IN POLYOLS CONTAINING UNSATURATION AND POLYURETHANES PREPARED THEREFROM

Louis C. Pizzini, Trenton, Mich.; Gerhard G. Ramlow, East Windsor, N.J.; John T. Patton, Jr., and William W. Levis, Jr., both of Wyandotte, Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Original No. 3,823,201, dated July 9, 1974, Ser. No. 311,809, Dec. 4, 1972. Application for reissue Aug. 25, 1975, Ser. No. 607,134

Int. Cl.[2] **C08L** *29/02;* **C08F** *2/14, 16/04*

U.S. Cl. 260—33.2 R **8 Claims**

1. A highly stable graft copolymer dispersion prepared by the in situ polymerization in the presence of a free radical catalyst at a temperature of from 70° C. to about 170° C. of

(a) an ethylenically unsaturated monomer or mixture of said monomers in

(b) an unsaturated polyol mixture containing from 0.10 mole to 0.70 mole of unsaturation per mole of polyol mixture, *said unsaturation being incorporated into the polyol mixture by the reaction of a polyol with an organic compound having both ethylenic unsaturation and a hydroxyl, carboxyl or epoxy group or by employing said organic compound as a reactant in the preparation of the polyol,* said polymerization carried out by adding the monomer and the catalyst to the polyol mixture.

Re. 29,015

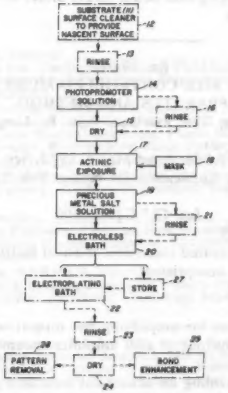
METHOD OF GENERATING PRECIOUS METAL-REDUCING PATTERNS

Michael Anthony De Angelo, Ewing Township, Mercer County, N.J. and Donald Jex Sharp, Albuquerque, N. Mex., assignors to Western Electric Company, Inc., New York, N.Y.

Original No. 3,562,005, dated Feb. 9, 1971, Ser. No. 719,976, Apr. 9, 1968. Application for reissue Dec. 4, 1975, Ser. No. 637,504

Int. Cl.[2] **B44D** *1/50;* **H05K** *3/12, 3/18*

U.S. Cl. 427—54 **31 Claims**



36. A method of producing an electrical circuit pattern on a non-conductive substrate which comprises the steps of:

selecting a metal salt selected from the group consisting of tin halides, titanium halides, lead halides [, ferric oxalate, ferric citrate, ferric tartrate, mercuric oxalate, mercuric citrate and mercuric tartrate] ;

coating said substrate with a solution containing said metal salt;

drying said coated substrate;

selectively exposing said dried substrate to radiation deep within the ultraviolet spectrum to generate a first pattern and a second pattern, said radiation being within the approximate range of 1800 A. to 2700 A. with approximately 75% of said radiation being at about the 2537 A. line, said radiation continuing until energy within the approximate range of 25 to 1000 milliwatt-seconds/cm.^{2} has impinged on said dried substrate, said first pattern being capable of reducing a precious metal from a salt solution thereof, said second pattern being incapable of reducing a precious metal;

selecting a precious metal salt from the group of precious metals consisting of iridium, osmium, palladium, platinum, rhodium, ruthenium, gold and silver, said precious metal being catalytic to an electroless plating bath;

immersing said exposed substrate in a solution containing said precious metal salt, said first pattern reducing said precious metal thereon to generate a precious metal pattern; and then

immersing said precious metal pattern in an electroless plating bath to produce said electric circuit pattern.

Re. 29,016

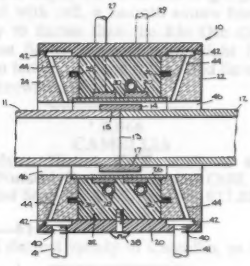
WELDING AND FORMING METHOD

George Raymond Peacock, Louisville, Ky., assignor to Thermatool Corporation, Stamford, Conn.

Original No. 3,603,759, dated Sept. 7, 1971, Ser. No. 4,173, Jan. 14, 1970. Continuation of Ser. No. 717,749, April 1, 1968, abandoned. Application for reissue Feb. 13, 1975, Ser. No. 549,465

Int. Cl.^{2} B23K *13/00*

U.S. Cl. 219—9.5 **19 Claims**



1. A forming method in which [members] *electrical conductors* are forced together at an interface thereof, said method comprising the steps of:

placing *said* conductors in contact with each other *to provide said interface therebetween;*

placing [a magnetic] *an induction* coil [adjacent] *and* said conductors *adjacent each other with said coil and said interface disposed relative to each other so that a current flowing in said coil will induce generally parallel currents in each of said conductors at said interface with current in one of said conductors flowing in the same direction as the current flowing in the other of said conductors;*

heating the portions of said conductors at said interface; and

passing [a forming current] through said coil *a forming current of characteristic frequency and magnitude sufficient* to [induct] *induce said generally parallel* currents in each of said conductors [flowing generally parallel to each other and to] *at* said interface *in a magnitude sufficient to force* [said currents induced by said forming current causing] each of said conductors [to be forced towards] *against* the other in a direction generally perpendicular to said interface *and to cause forming of at least one thereof.*

Re. 29,017

ILLUMINATION SYSTEM FOR COPIER MACHINES ARRANGED TO MINIMIZE GLARE WITH RESPECT TO AN OPERATOR

Leon H. Hildenbrandt, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Original No. 3,758,774, dated Sept. 11, 1973, Ser. No. 264,093, June 19, 1972. Application for reissue Apr. 16, 1975, Ser. No. 568,753

Int. Cl.^{2} F21S *1/00;* **G03B** *27/54*

U.S. Cl. 240—41.35 R **7 Claims**

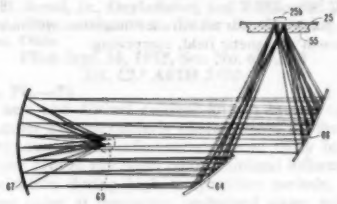
1. An illumination system for establishing a line of light substantially coextensive with a linear exposure station having a predetermined finite length within a light zone, comprising:

a light source;

a paraboloid reflector formed to receive light from said source and to project in a first light path a beam of light of substantially rectangular cross-section having a relatively long first dimension and a relatively short second dimension, said relatively long dimension corresponding to said predetermined finite length;

a parabolic reflector formed to receive said substantially rectangular beam of light and to project a line of light therefrom corresponding to said predetermined finite length;

first means mounting said light source and said paraboloid reflector in order to project said substantially rectangular beam of light to said parabolic reflector in said first light path and within said light zone; and



second means mounting said parabolic reflector to re-form and re-direct along a second path said substantially rectangular beam of light as a line of light of said predetermined finite length and to project said line of light to said exposure station, whereby light is confined essentially within said light path and light scattering is minimized.

Re. 29,018

CONTINUOUSLY VARIABLE RESISTANCE ATTENUATOR USING LOSSY TRANSMISSION LINE AND HAVING CONSTANT SIGNAL TRANSIT TIME

Valdis E. Garuts, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Original No. 3,740,676, dated June 19, 1973, Ser. No. 239,375, Mar. 29, 1972. Continuation of Ser. No. 85,678, Oct. 30, 1970. Application for reissue June 9, 1975, Ser. No. 585,014

Int. Cl.^{2} H01P *1/22*

U.S. Cl. 333—81 A **16 Claims**

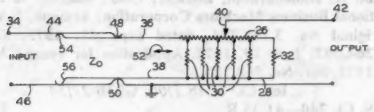
1. A variable resistance attenuator of wide frequency bandwidth comprising:

first transmission line means of substantially uniform characteristic impedance including a signal conductor and a ground conductor forming a lossy transmission line, said signal conductor being of resistance material to provide an attenuation resistance distributed substantially uni-

formly along the length of said signal conductor, and a plurality of separate shunt resistors of substantially the same resistance connected between said signal conductor and said ground conductor and spaced substantially uniformly along the length of said signal conductor;

first signal coupling means connected to one end of said signal conductor through a first connection;

second signal coupling means connected to said signal conductor through a second connection;



control means for moving said second connection along the attenuation resistance of said signal conductor to vary the attenuation setting; said control means moving the first transmission line means to change the attenuator setting of said second connection while maintaining the same electrical signal path length between said first connection and said second connection.

Re. 29,019

INTRUDER DETECTION SYSTEM

Shmuel Shtrikman, Rehovoth, Israel, assignor to Yeda Research & Development Co. Ltd., Rehovoth, Israel

Original No. 3,754,223, dated Aug. 21, 1973, Ser. No. 8,755, Jan. 21, 1970. Application for reissue Aug. 20, 1975, Ser. No. 606,318

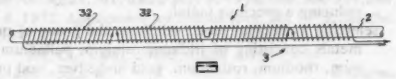
Claims priority, application Israel, Jan. 22, 1969, 31466

Int. Cl.[2] G08B *13/24*

U.S. Cl. 340—258 C **5 Claims**

1. A passive line for an intruder detection system operable in the earth's magnetic field, comprising:

a. a plurality of elongated high-permeability wires arranged in lengthwise contact to define a flexible high-permeability magnetic core un-magnetized except for the effect thereon of the earth's magnetic field, the cross-section of the wires being very much smaller than the cross-section of the core; and



b. a coil wound on the core having at least one layer of insulated conductor wound on the core in the form of many successive lengthwise serially connected sections of respectively opposite-winding handedness, the sections being of substantially equal length and homogeneously wound.

PLANT PATENTS

GRANTED OCTOBER 26, 1976

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,964
NECTARINE TREE
Henry G. Wong, 900 Jackson St., Oakland, Calif. 94607
Filed Nov. 4, 1975, Ser. No. 628,644
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—41 1 Claim

1. A new and distinct variety of nectarine tree, substantially as illustrated and described, identified by the characteristics enumerated above, and characterized particularly as to novelty in comparison to other clingstone nectarines by the season of ripening, by the bearing of fruit having yellow skin partly overspread with red, flesh of pleasant flavor and aroma, with yellow color throughout including the pit, a stone with characteristics as hereinabove described, and by the ability of the tree to produce such fruit with limited sunlight.

3,965
PEACH TREE
Alexander C. McLeod, Rte. 1, McBee, S.C. 29101
Filed Aug. 4, 1975, Ser. No. 601,799
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—43 1 Claim

1. A new and distinct variety of peach tree substantially as shown and described characterized particularly as to novelty by fruit having the combination of an early ripening season 7–10 days before the Loring peach, a most attractive form being slightly elongated from apex to cavity, having a bright red cheek and bright golden ground color diffused with red, a smooth suture line and having less tendency to flatten than the Rio Oso Gem peach, a most delicious flavor sub-acid with slight indication of soluble tannin tending to lend full bodied flavor, and tendency to non-browning of the flesh.

3,966
CAMELLIA
Earl D. Hudson, Hemet, Calif., assignor to Monrovia Nursery Company, Azusa, Calif.
Filed Sept. 26, 1975, Ser. No. 617,058
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—61 1 Claim

A new and distinct variety of Camellia, as described.

3,967
BEGONIA PLANT
Margarete Rohde-Rieger, Nurtingen, Germany, assignor to Mikkelsens, Inc., Ashtabula, Ohio
Filed July 16, 1975, Ser. No. 596,453
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of begonia plant characterized particularly by its bright medium red, double flowers; short, full compact and upright growth habit in all seasons; a high degrese of self-branching; round, heavily textured dark green foliage with nearly complete edges; rapid propagation from leaf cuttings, with the cuttings consistently producing four to six adventitious shoots at all times of the year; excellent keeping quality and long flowering period and by its uniform leaf area on each plant.

3,968
BEGONIA PLANT
Leslie Woodriff, McKinleyville, Calif., assignor to Mikkelsens, Inc., Ashtabula, Ohio
Filed Sept. 5, 1975, Ser. No. 610,776
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of begonia plant known by the cultivar name Tiger Kitten and particularly characterized as to uniqueness by the combined characteristics of relatively fast rooting habit; bright green leaves with dark brown to dark green veinal mottling and hairy leaf margins; favorable susceptibility to growth regulators so as to achieve a massive leaf clump which can be maintained under high light and high temperature conditions; variable foliage color depending upon growth in plastic covered or glass greenhouses; dwarf, compact growth habit which renders plant capable of existing for several weeks under conditions of water and nutrient stress; superior leaf production; and attractive total plant appearance.

3,969
CHRYSANTHEMUM PLANT
Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio
Filed Sept. 30, 1975, Ser. No. 619,918
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—74 1 Claim

1. A new and distinct cultivar known by the cultivar name Amber and particularly characterized by the combined features of flat inflorescence form; daisy inflorescence type; bronze ray floret color; minimal inflorescence color oxidation during high temperature periods; green disc floret color at immature, unopened stage; minimal pollen development; uniform nine week flowering response to photoperiodic short-day control; diameter across face of inflorescence up to 3.25 inches at maturity; tall plant height; semi-upright branching pattern, and terminal spray formation during high temperature periods.

3,970
CHRYSANTHEMUM PLANT
Grace H. Mack, 108 Wahackme Road, New Canaan, Conn. 06840, and William E. Duffett, Akron, and Walter H. Jessel, Jr., Doylestown, Ohio; said Duffett and Jessel assignors to said Mack
Filed Oct. 6, 1975, Ser. No. 619,919
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—77 1 Claim

1. A new and distinct cultivar of chrysanthemum known by the cultivar name Pearls and characterized particularly as to uniqueness by the combined characteristics of flat inflorescence form; pompon inflorescence type; white inflorescence color; diameter across face of inflorescence up to one inch; permanence of inflorescence ranging from 21 to 28 days; short plant height; semi-spreading branching pattern; dark green foliage color; average natural season flowering date of October 1, and average flowering response period of 7 weeks in photoperiodic controlled flowering programs.

PLANT PATENTS

GRANTED OCTOBER 26, 1976

Illustrations for most patents are usually in color and therefore it is not practicable to reproduce them herein.

PATENTS

GRANTED OCTOBER 26, 1976

ERRATA

For CLASS	See PATENT NO.
084–283	3,987,700
090–011 C	3,987,712
180–049	3,987,768
096–001 SD	3,988,061
425–033	3,988,077
051–096	3,988,124
051–098	3,988,125
051–100 R	3,988,126
429–103	3,988,163
429–191	3,988,164
029–623.1	3,988,169
429–163	3,988,170
203–039	3,988,218
526–079	3,988,305
528–493	3,988,306
536–001	3,988,313
536–001	3,988,314
536–017	3,988,315
536–017	3,988,316
536–026	3,988,317
424–258	3,988,339
252–522	3,988,366
423–445	3,988,478
426–535	3,988,510
426–580	3,988,511
426–590	3,988,512
427–431	3,988,513
427–239	3,988,514
427–249	3,988,515
427–342	3,988,516
427–349	3,988,517
427–436	3,988,518
428–015	3,988,519
428–015	3,988,520
428–035	3,988,521
428–323	3,988,522
428–378	3,988,523
428–403	3,988,524
200–061.27	3,988,574
235–150.53	3,988,600
235–092 SH	3,988,601
235–150.1	3,988,602
235–153 AC	3,988,603
235–156	3,988,604

ERRATA—Continued

235–156	3,988,605
235–156	3,988,606
235–156	3,988,607
250–201	3,988,608
240–106 R	3,988,609
250–202	3,988,610
250–207	3,988,611
250–211 R	3,988,612
250–211 J	3,988,613
250–227	3,988,614
250–253	3,988,615
179–015 BS	3,988,674
323–093	3,988,684
332–007.51	3,988,704

PATENTS

GRANTED OCTOBER 26, 1976

NOTE—Cross reference listings of applications published under the first and second Trial Voluntary Protest Programs are located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

3,987,495
MOTORCYCLE HELMET

James D. Holley, Crowley, La., assignor to The Raymond Lee Organization, Inc., a part interest

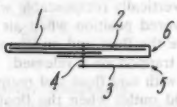
Filed Aug. 11, 1975, Ser. No. 603,311
Int. Cl.² A42B 3/00
U.S. Cl. 2—410 3 Claims

1. A helmet for motorcycle and the like comprising:
a rigid left half that takes the form of the left half of a conventional helmet that has been bisected along a central vertical plane running from the front of the helmet to the rear;
a rigid right half taking the form of a mirror-image of the left half;
a curved grooved track attached to one of the halves; and
a curved rail attached to the other half, the rail engaging the groove in the track to secure the two halves together.

3,987,496
INTERNAL BELT FOR GARMENTS

Christian Bernard, Mouvaux, France, assignor to Dollfus Mieg & Cie, Paris, France

Filed Feb. 28, 1975, Ser. No. 554,095
Claims priority, application France, Mar. 5, 1974, 74.07412
Int. Cl.² A41F 9/00
U.S. Cl. 2—220 7 Claims



1. The combination of an interior or integrated belt and a garment such as skirt or pants, said belt comprising a band of textile material, a reinforcing strip, said band being folded over the upper edge of said strip and toward the interior face of the garment, a tape, means attaching said tape to said belt through the folded-over part of said band; the edge of the material of which the garment is made being inserted between said tape and said folded-over part of said band, said garment material being folded over said tape with said belt being disposed adjacent the inner face of the garment, means securing said folded-over edge of the garment in said inserted position.

3,987,497
TENDON PROSTHESIS

Artur Stoy; Miroslav Štol; Vladimír Stoy, and Jiří Zíma, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

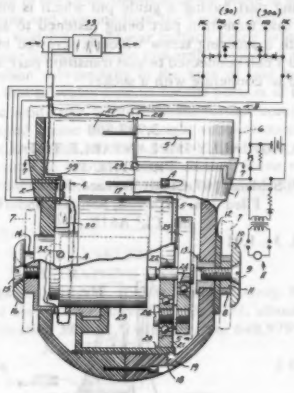
Filed Mar. 20, 1975, Ser. No. 560,215
Claims priority, application Czechoslovakia, Mar. 29, 1974, 2299-74
Int. Cl.² A61F 1/24
U.S. Cl. 3—1 9 Claims

1. Tendon prosthesis consisting of a core and of a sheath, the core consisting essentially of a linear polymer oriented predominantly in the direction of the main axis of the prosthesis and having a tensile strength of at least 100 kg/cm² the core as a whole having an elastic elongation in the range of between 8 and 50 percent, of its resting length, the sheath consisting of at least one layer of a substantially non-oriented hydrophilic polymer which is crosslinked and has an elastic elongation at least equal to and a water swelling capacity at least equal to said core.

3,987,498
ELECTRIC ELBOW

Carl Peter Mason, Oceanside, N.Y., assignor to Sidney Samole and Myron M. Samole

Continuation-in-part of Ser. No. 171,658, Aug. 12, 1971, abandoned. This application July 1, 1974, Ser. No. 484,948
Int. Cl.² A61F 1/06, 1/00
U.S. Cl. 3—1.1 21 Claims



1. An improved prosthetic joint comprising: a housing forming an internal rigid circular spline internally meshing with a flexible member, forming externally a spline and internally a circular cavity, said cavity containing a permanent magnet electric motor driving a planetary roller reduction harmonic drive wave generator, said flexible member, comprising an open cylindrical section closed on one end by a planar section (the bell end) forming a rigid output tang on the bell end coaxial with the axis of revolution of the flexible member (flexspline), and a limit assembly within the housing comprising two microswitches and four Diodes, whereby the motor may be shunted and power shut off at the limits wherein the improvement comprises:
a raceway inserted between the planetary rollers and the flexspline whereby the torque load within the flexspline is

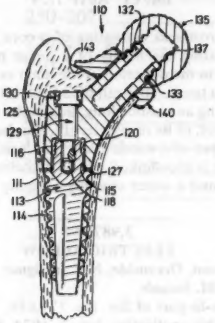
distributed and the load concentration under the planetary rollers is decreased.

3,987,499

SURGICAL IMPLANT AND METHOD FOR ITS PRODUCTION

Heinz Scharbach, Plankstadt; Achim Engelhardt, and Peter Bunz, both of Frankfurt, all of Germany, assignors to Sybron Corporation, Rochester, N.Y.

Filed Aug. 9, 1974, Ser. No. 496,268
Claims priority, application Germany, Aug. 10, 1973, 2340546
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.91 8 Claims



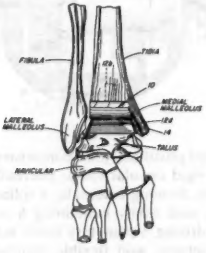
1. A metallic hip joint prosthesis at least partially coated with enamel, comprising a transition part having a recess, an anchoring part having a guide pin which is inserted in said recess, said transition part being fastened to said anchoring part with a securing screw which is screwed into said guide pin, and a ball connected to said transition part, said ball being adapted to cooperate with a socket.

3,987,500

SURGICALLY IMPLANTABLE TOTAL ANKLE PROSTHESIS

Allen P. Schlein, 107 Curtis Terrace, Fairfield, Conn. 06430

Filed Jan. 28, 1976, Ser. No. 653,104
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.91 8 Claims



1. In combination with a two-part prosthetic device for arthoplasty of the human ankle joint including a tibial component for replacing at least a part of the prepared distal end of the tibia and a talar component for replacing at least a part of the prepared proximate surface of the talus,

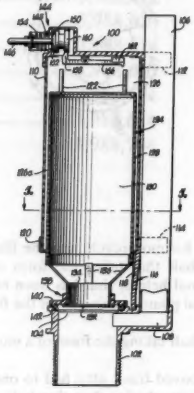
at least a first shield member formed of a metal alloy which is essentially non-reactive with body tissue and constructed and adapted to be attached to the prepared inner surface of the medial malleolus and to extend downwardly between the medial malleolus and the talar component when the latter is implanted, for preventing the medial malleolus from rubbing against said talar component and the bone on the outer surface of the talus.

3,987,501

TOILET FLUSH ASSEMBLY

Robert V. Anderson, Fort Worth, Tex., assignor to Producers Specialty & Mfg. Co., Inc., Fort Worth, Tex.

Continuation-in-part of Ser. No. 479,896, June 17, 1974, abandoned. This application June 27, 1975, Ser. No. 590,796
Int. Cl.² E03D 1/34
U.S. Cl. 4—67 R 14 Claims



1. A control for the outlet of a liquid supply tank comprising:

an open bottom housing defining a chamber extending upwardly from said open bottom;

means for mounting said housing within the tank with said open bottom overlying the outlet;

a float confined within said chamber and adapted for exposure to liquid within the tank through said open bottom of the housing,

said float being vertically reciprocable within the chamber between a lowered position when air is trapped in the chamber above the float and an upwardly buoyed position when the trapped air is released;

a valve coupled with said float and reciprocable therewith for closing said outlet when the float is in its lowered position and for opening said outlet when the float is in its buoyed position; and

actuator means for selectively trapping or releasing air within said chamber whereby to close or open said outlet respectively,

said actuator means including means defining escape orifice means from said housing above said float and mechanism shiftable between positions opening and closing said orifice means.

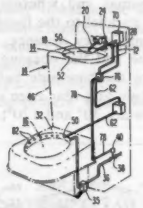
said mechanism including a plunger shiftable into and out of sealing relationship with said orifice means, means yieldably biasing said plunger toward said sealing relationship, and a latch disposed to releasably retain the plunger out of said sealing relationship, said latch further being disposed for actuation by the float when the latter approaches its buoyed position for releasing the plunger.

3,987,502

PLUMBING FIXTURE FOR PENAL INSTITUTION

Jack P. Hartmann, 414 Darby Road, Havertown, Pa. 19083

Filed Jan. 7, 1976, Ser. No. 647,213
Int. Cl.² E03D 11/02, 11/18
U.S. Cl. 4—75 10 Claims



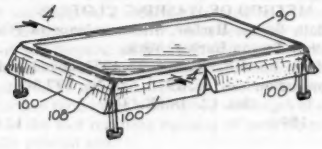
1. A plumbing fixture comprising: a bowl for liquid having a rim including structure defining an overflow chamber extending along the upper periphery of said bowl, said overflow chamber opening into said bowl and said structure providing an electrical ground, means including a supply line and a normally open solenoid valve in said supply line for supplying water to said bowl, a drain for said bowl, a sensing probe including a conductor extending through said overflow chamber in spaced relation to said structure providing said electrical ground, and means responsive to water completing an electrical circuit between said electrical ground and said sensing probe for energizing said solenoid valve and closing said supply line, whereby an overflow of water from said bowl into said overflow chamber such as may be caused by an obstruction in said drain will effect a termination of water supply to said bowl and thereby prevent water from overflowing the rim of said bowl.

3,987,503

MATTRESS SUPPORT

Jacob J. Kean, Spring Valley, N.Y., assignor to The Raymond Lee Organization, Inc., a part interest.

Filed Aug. 11, 1975, Ser. No. 603,441
Int. Cl.² A47C 17/14; A61G 7/10
U.S. Cl. 5—63 3 Claims



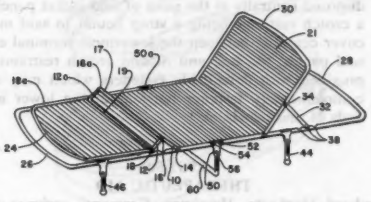
1. A mattress support, comprising:
a generally rectangular horizontal lower frame having an open center;
a like upper frame located above the lower frame and parallel to it;
a plurality of elongated straight members extending transversely between the sides of the upper frame;
a like plurality of flat horizontal tracks, each located below a corresponding member and extending transversely between the sides of the lower member;
a like plurality of opposed pairs of spring loaded roller means, each pair rolling inwardly towards each other on top of a corresponding track and being biased away from each other; and parallel arms connecting each roller means with the member in a manner that the roller means roll inwardly towards each other when the member is pressed downwardly towards the track by a weight.

3,987,504

KNEE COMFORT

Roslyn Fox, Montreal, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed July 21, 1975, Ser. No. 597,900
Int. Cl.² A47C 19/16
U.S. Cl. 5—111 4 Claims



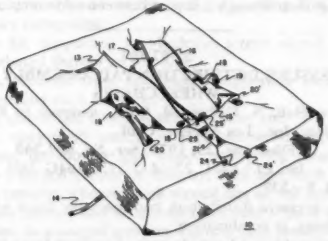
1. An adjustable support for receiving a reclining human figure comprising torso supporting means having an adjustable back, said torso supporting means comprising first U-shaped frame means with weight supporting means extending across the span of said first U-shaped frame means and secured to said first U-shaped frame means, said torso supporting means connected to leg supporting means comprising second U-shaped frame means having weight supporting means extending across the span of said second U-shaped frame means and being secured to said second U-shaped frame means, said first U-shaped means and said second U-shaped frame means being foldably connected to one another, said second U-shaped frame means having adjustable knee comfort means operatively secured thereto which comprises folding planar surface means extending in the same direction as the plane of said leg supporting means and intermediate the ends of said leg supporting means, said folding planar surface being adjustable from a planar configuration to an upwardly projecting inverted-V configuration substantially in the area of said leg supporting means that provides support for the portion of the leg under the knee, said knee comfort means further comprising foldable U-shaped frame means, weight support means extending across the span of said foldable U-shaped frame means and secured to said foldable U-shaped frame means, said leg supporting means being horizontally planar in the area in front of said knee comfort means.

3,987,505

RESTRAINING DEVICE

Wilma Jayne Hickey, 240 NW. 16th St., Ontario, Oreg. 97914

Continuation of Ser. No. 540,069, Jan. 10, 1975, abandoned.
This application Jan. 14, 1976, Ser. No. 648,979
Int. Cl.² A47G 9/00
U.S. Cl. 5—336 3 Claims



1. A bed-fitted patient restraining device, comprising:

a mattress cover being fabricated to conform about the top mattress of a bed, said mattress cover including means for securing said mattress cover to said mattress; and

a restraint jacket including a pair of complementary panels corresponding to front panels of a sleeveless bodice garment, said panels being secured at their upper ends and sides corresponding to sides and shoulder portions of said garment, with openings through which the patient's arms may be disposed, matable edges of said jacket panels being provided with fasteners, arm restraining straps disposed centrally at the sides of said jacket panels, and a crotch restraint being a strap bound to said mattress cover centrally between the lowermost terminal ends of said panels, the free end of said crotch restraint being provided with detachable fasteners which may engage complementary fastener portions at the lower interior ends of said panels.

3,987,506

THERAPEUTIC AID

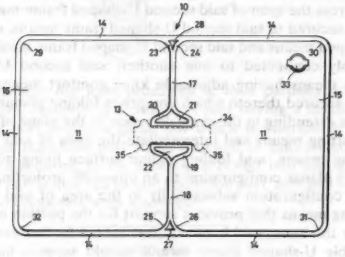
Bernhard Markwitz, Hamburg, Germany, assignor to KG Bema "Schwimmflugel" Warenhandelsgesellschaft mbH & Co., Hamburg, Germany

Filed July 16, 1975, Ser. No. 596,459

Claims priority, application Germany, July 26, 1974, 2436018

Int. Cl.[2] A47C *27/08*

U.S. Cl. 5—338 **6 Claims**



1. A therapeutic aid in the form of a cushion comprising a two-compartment envelope formed of flexible, fluid impervious, heat-weldable, synthetic plastic material, an elongated weld line defining first and second compartments within said envelope, said weld line including first and second portions, said portions each including an end region and said end regions being spaced from each other forming a restricted port in said weld line permitting communication between said compartments, each end region including a port portion transversely disposed to the length of said weld line, said port portions of each end region being substantially parallel to each other to define a tubular port through said weld line whereby fluid may flow through said port between said compartments.

3,987,507

PRESSURE DISTRIBUTION PAD ASSEMBLY FOR WHEELCHAIRS

Matthew Hall, N. Hollywood, Calif., assignor to Everest & Jennings, Inc., Los Angeles, Calif.

Filed Aug. 25, 1975, Ser. No. 607,360

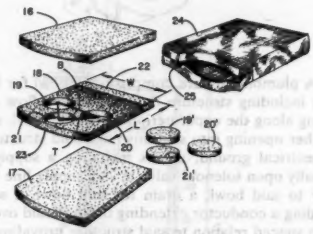
Int. Cl.[2] A47C *27/14, 27/15;* **A61G** *7/06*

U.S. Cl. 5—338 **3 Claims**

1. A pressure distribution pad assembly for a wheelchair comprising, in combination:

a. first and second outside pads of resilient foam material of a given density;

b. a center pad of resilient foam material of density greater than said given density, sandwiched between said outside pads, the front edges of the pads being straight and in which the rear edges are convexly curved in the plane of the pads, said center pad having three cut-outs defining openings therethrough positioned on the vertices of an imaginary isosceles triangle in the plane of the center pad, the openings at the vertices of the triangle defining the base angles being equal in area, the opening at the vertex opposite the base side being of less area than either one of the other openings, and, wherein the base of said isosceles triangle is parallel to the front edge of the pad and spaced therefrom a given distance, greater than one half the length of the pad the opening at the vertex of the triangle opposite the base side being between the base side of the triangle and rear edge of the pad, the vertex angle being between 30° and 120°;



c. filler foam material in said openings of density less than said given density, said filler foam material comprising a total volume between one eighth and one half the volume of said center pad; and

d. a cover enclosing the pads, said cover having manually operable closure means permitting removal of the pads therefrom so that said cover can be cleaned and the pads reinserted, the seat cushion being symmetrical with respect to its top and bottom surfaces so that it functions to distribute the pressure exerted on a person seated on either the top or bottom surface with the convex rear portion adjacent the rear of the person, said pressure distribution resulting from said cut-out openings containing said filler foam material in the center pad.

3,987,508

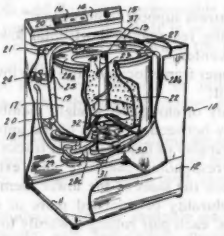
METHOD OF WASHING CLOTHES

Clark I. Platt, Benton Harbor, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Division of Ser. No. 418,378, Nov. 23, 1973, abandoned. This application May 15, 1975, Ser. No. 577,884

Int. Cl.[2] D06F *13/00*

U.S. Cl. 8—159 **12 Claims**



1. The method of washing clothes by subjecting them to a substantially continuous rollover movement pattern in a clothes washer comprising:

placing the clothes in a receptacle in the washer containing a washing liquid,

agitating the clothes in the lower portion of the receptacle by applying oscillatory agitation forces to the clothes, scrubbing them and forcing them outwardly from the center of the receptacle,

forcing the clothes upwardly towards the top of the receptacle and then inwardly toward its center, and forcing the clothes downwardly towards the lower portion of the receptacle by unidirectionally rotating helically disposed surfaces against said clothes to direct said clothes downwardly in said receptacle,

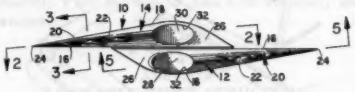
whereby the clothes are subjected to a positive and continuous rollover movement pattern within the receptacle.

3,987,509

SWIMMING TAIL

Samuel Patterman, Surfside, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Sept. 8, 1975, Ser. No. 611,547
Int. Cl.² A63B *31/08*
U.S. Cl. 9—309 **1 Claim**



1. A composite swimming tail apparatus comprising: a pair of separate elongated flippers adapted to be worn on the feet of a user and to be operated with the feet maintained in side by side relationship; said flippers having generally straight side surfaces facing each other for enabling said flippers to abut each other at said side surfaces to form said composite swimming tail; each of said flippers having a foot receiving opening having a heel end and a toe end; a first elongated fin projecting rearward from the heel end of the foot receiving opening of one of said flippers; a second elongated fin projecting frontward from the toe end of the foot receiving opening of the other of said flippers; each of said first and second fins being of teardrop-shaped transverse cross-section oriented to define a longitudinally directed upwardly facing linear edge; said cross-section tapering in width along the length of each of said fins from the foot receiving opening of each flipper to a substantially pointed end.

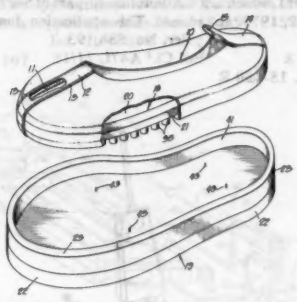
3,987,510

METHOD OF MAKING FOOTWEAR

Peter J. Sbicca, 2895 Lorain Road, San Marino, Calif. 91108

Filed Sept. 2, 1975, Ser. No. 609,395
Int. Cl.² A43D *9/00*; A43B *5/00*
U.S. Cl. 12—142 EV **8 Claims**

1. That method of making an article of footwear which comprises forming an upper from a strip of elastic webbing of uniform width, severing one pair of ends of said strip on the bias, securing said bias-severed ends together to form a ringlet, stretching the longer edge of said upper to embrace the edge of a male shoe mold member with the longer edge of said upper projecting slightly beyond the adjacent outer rim edge of said mold member, and inserting said upper and said male mold member downwardly into a female mold member containing an uncured elastomeric composition in liquid phase while said composition cures to form a sole member in which



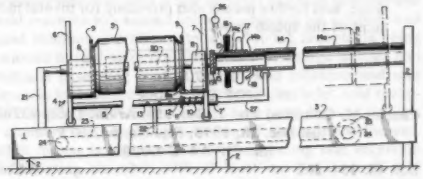
the lower edge of said elastic upper is firmly and fixedly embedded.

3,987,511

DEVICE FOR SEPARATING CYLINDRICAL SCREEN STENCIL FROM AN INK TUBE AND WASHING THE STENCIL

Karl Mayer, Ernst-Wlattniggasse 17; Friedrich Kampitsch, Fischlstrasse 27/6, both of A-9010 Klagenfurt; Helmut Frey, Ressnigweg 34, A-9170 Ferlach, and Friedrich Letschnig, J.F.Perkonig-Gasse 16a, A-9010 Klagenfurt, all of Austria

Continuation-in-part of Ser. No. 521,944, Nov. 7, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,547
Claims priority, application Austria, Nov. 9, 1973, 9479/73
Int. Cl.² A46B *13/06*
U.S. Cl. 15—21 D **10 Claims**



1. A device for separating a cylindrical screen stencil from an ink tube positioned therein and for washing said stencil, said device comprising:

means for supporting a cylindrical screen stencil having positioned therein an ink tube;

means, separate from said stencil supporting means, for supporting such ink tube;

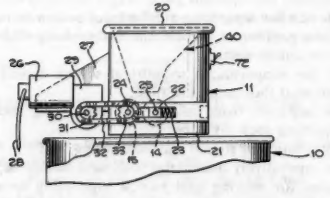
fixedly positioned stencil washing means; and

means, operatively associated with said stencil supporting means, for moving said stencil supporting means, and thus a stencil supported thereby, back and forth from a first position wherein such stencil has an ink tube positioned therein and is spaced from said stencil washing means, to a second position wherein such stencil is separated from the ink tube and is positioned over said stencil washing means, said stencil washing means washing the interior or said stencil as said stencil is moved from said first position to said second position.

3,987,512
TILTING FLOOR CLEANER
Carl E. Meyerhoefer, Little Neck, N.Y., assignor to General Signal Corporation, New York, N.Y.
Division of Ser. No. 432,531, Jan. 11, 1974, Pat. No. 3,947,911, which is a continuation-in-part of Ser. No. 323,335, Jan. 12, 1973, abandoned. This application June 12, 1975, Ser. No. 586,193
Int. Cl.² A47L 11/16
U.S. Cl. 15—50 R 3 Claims

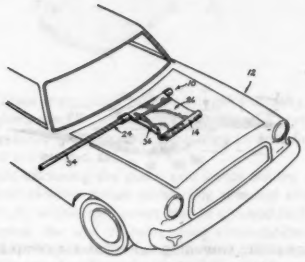
1. In a rug scrubbing machine, the combination of:
a frame with at least one substantially flat, circular scrubbing brush rotatably mounted on the frame and positioned below said frame;
a driving motor on said frame to drive the brush;
at least one front wheel for supporting the machine;
a housing for said machine, said housing including a skirt portion;
a splash guard extending below said housing, and means for engaging said splash guard with the skirt portion so as to allow for vertical movement of the splash guard as different rug configurations are encountered, said means including a slot means in said skirt portion at the front of the machine, a pair of tabs on said splash guard engageable with said slot means, and further means providing for snap-locking of said splash guard at the rear of said machine, said further means also providing for pivotal movement of the splash guard.

3,987,513
MOP WRINGER
Charles M. Gonzales, Rte. 1, Box 110, Arvin, Calif. 93203
Filed Dec. 18, 1975, Ser. No. 642,073
Int. Cl.² A47L 13/60
U.S. Cl. 15—262 7 Claims



1. An automatic electric operated mop wringer for a conventional wet mop comprising a trough structure having top and bottom openings and at least one sloping side wall, a pair of counterrotating wringer rollers in spaced parallel relationship below said bottom opening, a forward and reverse acting electric motor means and a drive therefrom to the rollers, a panel at said side wall having a pivotal mounting on said trough structure and spring biased into said trough, a multiple step electric switch having an armature normally spring biased to open position and attached to and adapted to be closed by action of said panel upon engagement with successive portions of the mop, an electric circuit including a primary branch interconnecting said motor in a forward direction and a first step of said multiple step switch, a secondary branch of said electric circuit interconnecting said motor in a reverse direction and a second step of said multiple step switch, primary relay means in said circuit subject to actuation by said second step adapted to energize said secondary branch and reverse the action of the motor until engagement of the mop on said panel is relieved to an amount effecting return of said panel to initial position and return of said switch to open position.

3,987,514
DEVICE FOR REMOVING LIQUID AND SIMILAR MATTER FROM A SURFACE
David E. Cooper, 222 Lawndale Place, Michigan City, Ind. 46360
Filed May 16, 1975, Ser. No. 578,117
Int. Cl.² A47L 5/16
U.S. Cl. 15—409 7 Claims



1. A device for removing matter from a surface comprising an elongated inverted channel member having an arch-shaped cross sectional configuration, said channel member having opposite ends and first and second side edges extending between said ends, an air flow source, tube means for the conduction of air from said air source having one end associated with said air flow source and having its other end terminating within said channel member, said tube means other end being directed toward one of said channel member ends for directing air through said channel member and out said one channel member end, and means connected to said channel member for causing said channel member to contact said surface at the side edges of the channel member whereby said air flow through said channel member will cause the matter upon said surface between said side edges to be blown from the surface and out said channel member end.

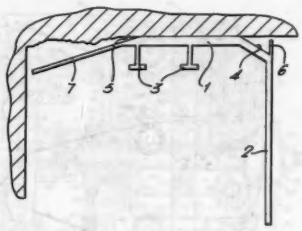
3,987,515
CURTAIN BOARD
Aimo Jarmo Juhani Suvitie, and Seppo Juhani Suvitie, both of Sirkkalankatu 22 as 6-7, Turku, Finland
Filed Mar. 25, 1975, Ser. No. 561,902
Claims priority, application Finland, Mar. 29, 1974, 966/74
Int. Cl.² A47H 15/00
U.S. Cl. 16—94 D 5 Claims

1. A curtain board adopted for mounting along the ceiling of a room including:
an elongated base member having a substantially planar portion adapted to be disposed horizontally along said ceiling and having front and rear longitudinal edges, said base member having an elongated front portion extending outwardly and downwardly from said planar portion so

that said front edge of said base member is spaced from said ceiling;

slide means mounted within and extending along said base member;

a first substantially vertically disposed member attached to and extending downwardly from said front edge of said base member;



an elongated extension projecting outwardly and sloping downwardly from said rear edge of said base member so that the outer edge of said extension is spaced from said ceiling; and

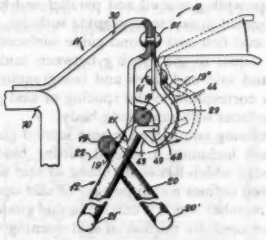
a second substantially vertically oriented member extending upwardly from the top of said first vertically oriented member.

3,987,516

LOCKABLE HINGE STRUCTURE

Robert Beck Winsor, Senneville, and George Thomson, Pierrefonds, both of Canada, assignors to IEC-Holden Ltd., Montreal, Canada

Filed Nov. 5, 1975, Ser. No. 628,897
Int. Cl.² E05D *11/10*
U.S. Cl. 16—143 **14 Claims**



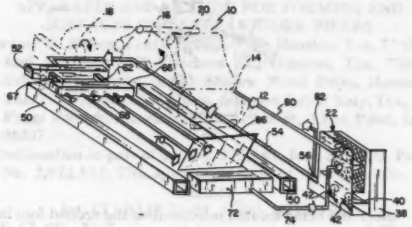
1. A lock hinge comprising a latch bracket and a base bracket; said base bracket having a pivot bar; said latch bracket having a saddle member defining a hinge seat with a mouth opening for receiving at least a portion of said pivot bar therein; a latch member having a lever end and a gate end; said latch member being interconnected to said saddle member by a flexible plate which is secured adjacent one end to said saddle member and adjacent an opposed end to said latch member, said gate end being displaceably held adjacent said mouth opening of said hinge seat by said flexible plate to retain said pivot bar captive in said hinge seat to interconnect said latch bracket to said base bracket, said gate end being displaceable away from adjacent said hinge seat mouth opening by pulling said lever end in a predetermined direction against the spring load exerted by said leaf spring.

3,987,517

PNEUMATIC DUST COLLECTING SYSTEM FOR FIBER PROCESSING MACHINE

Ettore Bonalumi, Via Lega Lombarda 7, Bergamo, Italy

Continuation-in-part of Ser. No. 263,594, June 16, 1972, abandoned. This application June 26, 1975, Ser. No. 590,703
Claims priority, application Italy, June 17, 1971, 25968/71
Int. Cl.² D01G *15/76*
U.S. Cl. 19—107 **8 Claims**



1. A pneumatic dust collecting system for a fiber processing machine comprising a plurality of beams adapted to rest on a floor and support a fiber processing machine above the floor, a tank for the collection of dust and fibrous material, a chamber within said tank adapted to receive and collect separate streams of said dust and fibrous material, at least one wall of said chamber being adapted to function as a filter for said dust and fibrous material, an air expansion compartment within said tank adjacent said receiving and collecting chamber, at least said filter wall of said chamber being common to said chamber and compartment, a blower assembly positioned within said tank adapted to apply suction to said compartment and to draw air therefrom, an air pressure stabilizing chamber, means for connecting said stabilizing chamber with said tank so as to convey a stream of pressurized air thereto from said tank, an air manifold having a plurality of linearly spaced discharge nozzles connected to said stabilizing chamber and positioned beneath one end of said machine, said nozzles being adapted to discharge a blanket of air beneath said fiber processing machine from a first location adjacent said one end of said machine to a second location adjacent the opposite end of said machine, a waste material receiving receptacle being positioned at said second location, said discharge nozzles and receptacle extending transversely of said machine and said receptacle including a transversely extending inlet, said receptacle being in communication with said receiving and collecting chamber for supplying a stream of air and dust thereto, conduit means being provided for connecting said receiving and collecting chamber with at least one location of said machine where waste fibrous material tends to accumulate, and means for effecting operation of said blower assembly, whereby waste material on the floor beneath said machine is acted upon by air streams discharged from said nozzles and suction forces emanating from the inlet of said receptacle and thereby is advanced in a unidirectional manner to said receptacle for conveyance to said receiving and collecting chamber.

3,987,518

BELT RETAINER

Robert F. Collins, Barrington, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Jan. 22, 1975, Ser. No. 542,999
Int. Cl.² F16G *3/00*; A41B *9/00*
U.S. Cl. 24—31 R **9 Claims**

1. A belt assembly for an operating room gown, comprising:

an elongated belt associated with the gown and having an end section for closing the gown, said end section having a pair of side edges, an outer end edge, and first and second opposed surfaces; and

a protective member for the belt comprising, an outer end a sheet of flexible material covering an outer end of said one end section, said sheet having an inner surface facing the belt, a lateral pleat defining first and second fold lines, with said first fold line overlying the inner surface of said

sheet and being located intermediate the second fold line and said outer end edge of the protective member, said belt having a pleat interleaved with the pleat of said sheet to releasably retain the outer end of the belt in the protective member.

3,987,519

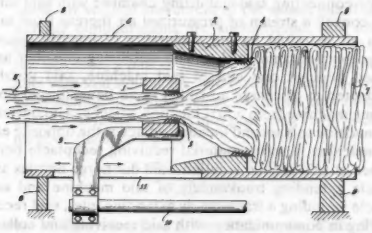
APPARATUS FOR CRUSHING CLOTH

Stephen J. Potosnak, Clifton, and Carl J. Russo, Montvale, both of N.J., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,386

Int. Cl.² D06C *23/04*; D06J *1/02*

U.S. Cl. 26—69 R **9 Claims**



1. A machine for the continuous crushing of cloth comprising, in combination,

a. a tube having entrance and exit portions, the exit portion of which constitutes a chamber in which crushed cloth accumulates,

b. A fixed surface provided near the exit portion of the tube, said surface having at least one portion provided with internal projections slanting toward the exit portion of the tube,

c. A movable ring positioned in front of said fixed surface and beyond the entrance portion of the tube, said ring being provided with internal projections slanted towards said exit portion, and

d. means for reciprocating said movable ring whereby when a rope of cloth is threaded through the movable ring and the fixed surface, and reciprocation of the movable ring is started, successive portions of the cloth are thereby stuffed through the movable ring and fixed surface into the exit portion of the tube, and backward motion of the cloth is prevented by the slanted projections in the fixed surface whereby the cloth is stuffed into the exit portion and crushed.

3,987,520

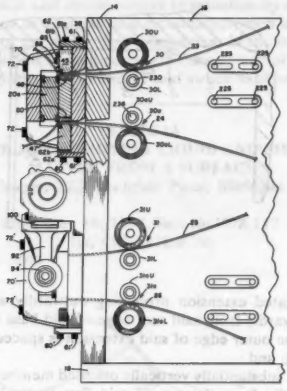
MACHINE FOR MAKING EXPANDED METAL

David B. Parkinson, Cleveland Heights, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Division of Ser. No. 388,400, Aug. 15, 1973, Pat. No. 3,893,214. This application Dec. 17, 1974, Ser. No. 533,484

Int. Cl.² B21D *31/02*; B26D *5/42*

U.S. Cl. 29—6.2 **4 Claims**



1. Apparatus for manufacturing expanded sheet stock comprising:

a. a first blade member including a blade body having spaced, generally planar and parallel faces with a first cutting edge defining a peripheral edge portion of at least one of the faces;

b. guide means defining spaced, generally planar and parallel first and second guide surfaces engaged respectively with the opposed faces of said body, said first guide surface being definend by a unitary guide member which extends over said body and includes integral depending portions providing spaced and parallel end faces releasably connected to said second guide surfaces, the spacing between said first and second guide surfaces being substantially equal to the spacing between said first guide surface and said end faces and being accurately maintained to correspond to the spacing of said parallel and planar surfaces with said blade body;

c. means defining an opening in said second guide surface, said means including a second cutting blade having a cutting edge which lies in the plane of said second guide surface and defines a side portion of said opening;

d. a clamp member which is carried in said guide means and defines an opposite portion of said opening; and

e. means biasing said clamp member toward the second cutting blade.

3,987,521

MACHINE FOR MAKING EXPANDED METAL

David B. Parkinson, Cleveland Heights, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Division of Ser. No. 388,400, Aug. 15, 1973, Pat. No. 3,893,214. This application Dec. 17, 1974, Ser. No. 533,683

Int. Cl.² B21D *31/02*; B26D *5/14*

U.S. Cl. 29—6.2 **4 Claims**

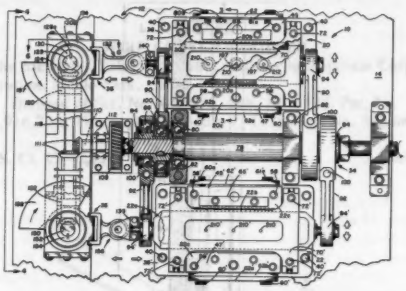
1. Apparatus for expanding metal strip comprising:

a. first and second movable blade members each having at least one cutting edge;

b. first and second stationary blade members respectively mounted for cooperation with said first and second movable blade members;

c. support means for supporting each of said movable blade members for independent guided movement in at least two directions in a common plane;

d. drive means for said blade members, said drive means including means for imparting movement to said blade members to move them substantially simultaneously in opposite directions generally perpendicular to their cutting edges whereby said apparatus is substantially com-



pletely dynamically balanced for high speed operation; and

e. said movable blade members each having two cutting edges extending generally parallel wherein there are four of said stationary members each positioned to cooperate with a separate one of said cutting edges whereby said apparatus operates to shear four separate metal strips with the forces of shearing substantially dynamically balanced.

3,987,522

METHOD OF MANUFACTURING AN IMAGE DISPLAY DEVICE INCORPORATING PROXIMITY FOCUSSING

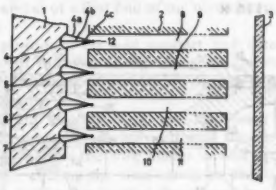
Gilbert Eschard, and Valere Dominique Louis Duchenois, both of Paris, France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 17, 1974, Ser. No. 515,453

Claims priority, application France, Oct. 17, 1973, 73.37039

Int. Cl.² H01J 9/20

U.S. Cl. 29—25.18 2 Claims



1. Method of manufacturing image display apparatus having a photocathode which is proximity focussed with respect to a micro-channel plate, comprising the steps of:

positioning a photocathode substrate adjacent to the input face of a microchannel plate, the substrate having a surface facing the microchannel plate which may be altered by ion radiation bombardment;

directing ion radiation from the channels of the microchannel plate by imposing a suitable voltage potential across the microchannel plate in a suitable vacuum atmosphere to alter the surface of the substrate in a pattern of individual areas corresponding to the channels of the microchannel plate;

forming a bowl-shaped photo-emissive recess at each of the altered individual areas; and

spacing the substrate from the microchannel plate by a distance which results in each bowl-shaped photo-emissive recess being proximity focussed on the input aperture of the same channel that defined the individual area at which the bowl-shaped photoemissive recess was formed.

3,987,523

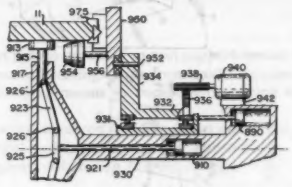
APPARATUS AND METHOD FOR FORMING END SURFACES ON ANNULAR WORK PIECES

Jerome W. Nelson, 11410 Holidan Way, Houston, Tex. 77024; Earl B. Nay, 2210 Dearborn St., Houston, Tex. 77055; Eric W. Wittmann, 10223 Shadow Wood Drive, Houston, Tex. 77043; Robert E. Pollock, deceased, late of Katy, Tex., by Peggy Pollock, executrix, 9528 Arthur St., Crow Point, Ind. 46307

Continuation-in-part of Ser. No. 373,483, June 25, 1973, Pat. No. 3,922,517. This application Aug. 11, 1975, Ser. No. 603,363

Int. Cl.² B23P 23/04, 19/00; B23B 3/00

U.S. Cl. 29—33 T 5 Claims



4. A method of forming a thin annular edge in the inner part of an annular end of a hollow cylindrical work piece such as a pipe, which comprises holding said pipe firmly against rotation and against deformation from a substantially circular shape, cutting and end profile on said annular end with an outer bevel, an intermediate land and an inner bevel, and forcibly cold rolling the interior cylindrical surface of the work piece to swage the metal outwardly and axially towards said end, thereby forming a sharp tapered annular edge which serves as a heat sink.

3,987,524

CUTTING TOOL

Walter Hochmuth, Nurnberg, and Hans Peter Hollfelder, Fuerth, both of Germany, assignors to Firma Robert Zapp, Werkzeug-und Maschinenfabrik GmbH, Stuttgart, Germany

Filed Mar. 1, 1976, Ser. No. 662,981

Claims priority, application Germany, Mar. 4, 1975, 2509226; Dec. 6, 1975, 2555035

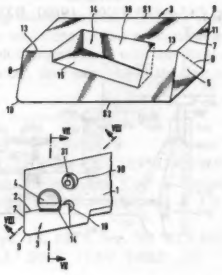
Int. Cl.² B26D 1/00

U.S. Cl. 29—96 20 Claims

1. A cutting tool comprising a tool holder having a recess, said recess having a bottom surface, a cutting bit in said recess, a clamping jaw securing said cutting bit to said tool holder, said cutting bit having four longitudinal sides joining one another to form longitudinal edges with oppositely disposed longitudinal edges defining the main cutting edges of the tool bit, said cutting bit having frontal faces at the longitudinal ends thereof, said frontal faces terminating in edges defining auxiliary cutting edges, each of said longitudinal main cutting edges intersecting a transverse auxiliary cutting edge to provide cutting means at diagonally opposite longitudinal ends of said cutting bit, each of said cutting means and associated cutting edges being operable to selectively effect a cutting action depending on the orientation of the mounting of the cutting bit on said tool holder, said cutting bit having means thereon defining a recess extending from at least one

of said longitudinal edges, said recess having seating surfaces against which said clamping jaw is clamped, one of said seating surfaces being inclined upwardly and rearwardly relative to said bottom surface and relative to one of said frontal faces when the latter has its auxiliary cutting edge exposed, the other of said seating surfaces being inclined upwardly and rearwardly relative to said bottom surface and relative to the other of said frontal faces when the latter has its auxiliary cutting edge exposed, whereby said cutting bit may be mounted in two different positions on said tool holder utilizing the same recess for accommodating the clamping jaw.

17. A cutting tool comprising a tool holder having a recess, said recess having a bottom surface, a cutting bit in said recess, a clamping jaw securing said cutting bit to said tool holder, said cutting bit having four longitudinal sides joining one another to form longitudinal edges with oppositely disposed longitudinal edges defining the main cutting edges of the tool bit, said cutting bit having frontal faces at the longitu-



dinal ends thereof, said frontal faces terminating in edges defining auxiliary cutting edges, each of said longitudinal main cutting edges intersecting a transverse auxiliary cutting edge to provide cutting means at diagonally opposite longitudinal ends of said cutting bit, each of said cutting means and associated cutting edges being operable to selectively effect a cutting action depending on the orientation of the mounting of the cutting bit on said tool holder, said cutting bit having means thereon defining a recess extending from at least one of said longitudinal edges, said recess having at least a partial arcuate surface, said clamping jaw having a corresponding arcuate surface which is accommodated in and which bears against said arcuate surface in said recess, said recess being constructed and arranged such that the cutting bit may be selectively changed to expose either frontal surface while said clamping jaw effects a clamping action in said recess, whereby said cutting bit may be mounted in two different positions on said tool holder utilizing the same recess for accommodating the clamping jaw.

3,987,525

ROTARY CUTTER

Morten Birger Hasfjord, Odeshog, Sweden, assignor to E.G. Larssons Hardmetall AB, Norrkoping, Sweden

Filed Sept. 30, 1975, Ser. No. 618,156
Int. Cl.² B26D 1/12
U.S. Cl. 29—105 R **4 Claims**

1. A rotary cutter comprising

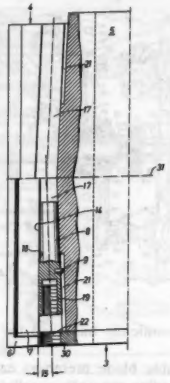
a cutter body (**6**) having a plurality of spaced slots around the periphery thereof, each said slot comprising a recess (**23**) defined by two outwardly tapering walls that extend in planes parallel to the axis of rotation of said cutter,

said recess being widened into a cylindrically recessed portion (**17**) the axis of which forms an angle with said axis of rotation;

a plurality of cutting inserts (**7**) loosely mounted in said recesses (**23**),

each said insert having a straight-line peripheral cutting edge parallel to said axis of rotation and converging side surfaces in abutment with the tapering walls of said recesses,

each said insert having a plane surface (**18**) remote from said cutting edge constituting a radial abutment surface the longitudinal edges of which extend parallel to said axis of rotation;



a plurality of cylindrical locking pins (**8**) located in said cylindrically recessed portions (**17**) radially inside the inserts,

each said pin being provided with a plane bevelled surface (**14**) formed at an angle to the axis of the pin equal to said prior angle between the axis of recessed portion (**17**) and said axis of rotation,

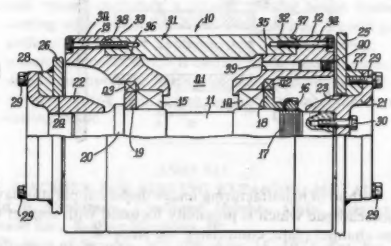
said plane bevelled surface (**14**) being arranged in plane surface abutment with said radial abutment surface (**18**) of the insert.

3,987,526

FAIRLEAD ROLLER ASSEMBLY

Eugene M. Poplawski, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 12, 1975, Ser. No. 576,514
Int. Cl.² B21B 13/02
U.S. Cl. 29—116 R **9 Claims**



1. A roller assembly comprising: shaft means having an annular shoulder; first and second annular end members defining mounting portions; first and second bearing means for rotatably mounting said end members respectively in coaxial, spaced relationship on said shaft means, said first bearing means abutting said shoulder and said second bearing means being axially adjustably positionable on said shaft means; a tubular drum member coaxially of said shaft means and having

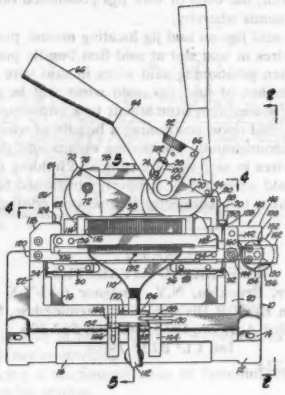
opposite end portions; securing means removably securing said drum member end portions to said end member mounting portions; and adjustable positioning means on said shaft means urging said second bearing means, said second end member, said drum member, and said first end member as a unit against said first bearing means to urge said first bearing means against said shoulder with an adjustable preload force and said second bearing means against said second end member with an equal preload force.

3,987,527

WIRE CUTTER-STRIPPER

John Meadows, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 442,398, Feb. 14, 1974, Pat. No. 3,916,733. This application July 7, 1975, Ser. No. 593,689
Int. Cl.² H02G 1/12
U.S. Cl. 29—236 3 Claims



1. A holder for a wire clamp of the type having hinged jaws with mating surfaces for holding a plurality of wires, the holder comprising

a support;

a stop positioned on said support and located to prevent movement of a first end of the wire clamp in a first direction;

a pin positioned on said support and located essentially adjacent the wire clamp to prevent movment of a wire clamp in a second direction opposite to said first direction; and

a wire clamp locating mechanism positioned on said support and capable of forcefully stressing the wire clamp at the second end of the wire clamp in said second direction, thereby causing the wire clamp to distort to further securely hold wires located therethrough.

3,987,528

NON-AXIAL LEAD ELECTRICAL COMPONENT PREPPER-TAPER APPARATUS

Albert W. Zemek, Windsor; Robert H. Holmes, and David L. Merithew, both of Binghamton, all of N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

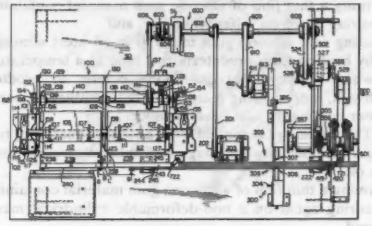
Filed Jan. 20, 1976, Ser. No. 650,674
Int. Cl.² B23P 23/00; B21F 1/00
U.S. Cl. 29—33 M 20 Claims

1. An apparatus for processing non-axial lead electrical components in their manufacturing strip and taping said leads between ribbons of tape comprising:

support means;

magazine means mounted to said support means for sequentially supplying a manufacturing strip with a plurality of said electrical components;

forming means mounted to said support means for removing said electrical components from said manufacturing strip and bending the leads of said electrical component into a substantial axial lead configuration;



transport means mounted to said support means for moving said manufacturing strips from said magazine means to said forming means in component spacing increments; and

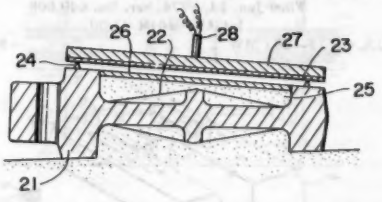
taping means mounted to said support means for taping said electrical components in said substantially axial lead configuration between ribbons of tape.

3,987,529

VALVE AND METHOD FOR MANUFACTURING THE SAME

Yoshiro Nakagawa, Koganei; Kohei Nonaka, Tokyo, and Chiyoshi Fukumoto, Shiga, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 294,160, Oct. 2, 1972, abandoned. This application Nov. 29, 1973, Ser. No. 419,944
Claims priority, application Japan, Nov. 1, 1971, 46-86228
Int. Cl.² B23P 15/00
U.S. Cl. 29—157.1 R 5 Claims



1. Method for manufacturing a valve comprising a valve body and a valve member, at least one of which has a seat attached thereto at a seat portion thereof and a recess adjacent to the junction between said seat and seat portion, said method comprising steps of placing a compressible filler material in said recess, placing a cladding plate in an opposite relationship to said seat portion with a predetermined space therebetween, forcing said cladding plate to the seat portion under an explosion pressure to thereby bond said cladding plate to said seat portion and shear said cladding plate along the periphery of said recess.

3,987,530

HEAT FUSER ROLL AND METHOD OF MANUFACTURE

Robert B. Atkin; Frederick C. Tarmann, and John H. Wong, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 11, 1975, Ser. No. 567,153
Int. Cl.[2] B05D *3/02*; B32B *25/20*
U.S. Cl. 29—132 12 Claims

1. The method of manufacturing an elastic and deformable coating comprising the steps of:

forming a thin film of silicone gum material containing no curing agent on a base member, and

treating said silicone gum material in an inert atmosphere by heating for a predetermined time to a temperature at which substantial cross-linking occurs to produce a tough, long-wearing elastic and deformable silicone rubber coating on said base member.

2. The method of manufacturing a contact heat fuser roll for fixing a resinous powder image to a substrate comprising the steps of:

forming a thin film of a silicone gum material containing no curing agent on a non-deformable cylindrical member, and

treating said silicone gum material in an inert atmosphere by heating for a predetermined time to a temperature at which substantial cross-linking occurs to produce a tough, long-wearing silicone rubber coating on said cylindrical member.

6. The method for manufacturing a contact heat fuser roll for fixing a resinous powder image to a substrate comprising the steps of:

coating a base member with a solution of silicone gum in an organic solvent, said solution containing no curing agent;

drying the coated base member in air for a time sufficient for substantially all of said solvent to evaporate, and

curing said silicone gum by heating the coated base member to a predetermined temperature in an inert atmosphere for at least a predetermined time to produce a tough, long-wearing silicone rubber coating on said base member.

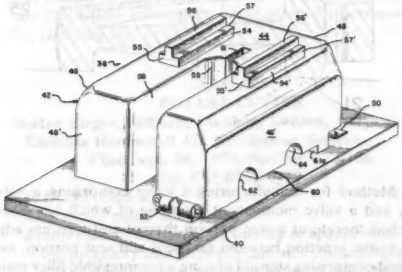
12. As an article of manufacture, a fuser roll prepared in accordance with the method of claim 2.

3,987,531

FIXTURE AND JIG FOR USE IN CONNECTING WIRES TO CONNECTORS

John James Tucci, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 14, 1976, Ser. No. 649,008
Int. Cl.[2] H01R *43/00*
U.S. Cl. 29—203 MW 8 Claims



1. A fixture for facilitating the placement of wires in first and second wire holding jigs, each of said jigs having wire locating and holding means thereon for holding said wires in side-by-side parallel relationship, said fixture comprising:

a fixture block having a jig supporting surface.

a wire-receiving slot in said fixture block, said slot intersecting said surface, said slot having an inner end,

first and second jig locating means on said surface for locating said first and second wire jigs thereon, said locating means being effective to locate said jigs on each side of said slot in parallel aligned relationship in orientations with said wire locating means extending transversely with respect to said slot, said inner end of said slot being substantially midway between the ends of jigs positioned on said jig locating means, and

first and second wire bundle positioning means for selectively positioning a bundle of wires in said slot in either of first and second positions with the axis of said bundle extending normally of said surface, said first bundle positioning means being effective to position a bundle of wires at said inner end of said slot, said second bundle positioning means being effective to position a bundle of wires in said slot at a location which is adjacent to, and spaced from, the ends of wire jigs positioned on said jig locating means whereby,

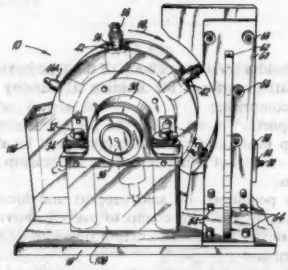
upon locating said jigs on said jig locating means, positioning a bundle of wires in said slot at said first bundle positioning means, and then positioning said wires in said wire locating and holding means of said jigs, said wires will be properly positioned for subsequent attachment to a connector in one configuration, and upon positioning a bundle of wires in said slot at said second bundle positioning means and then positioning said wires in said wire locating and holding means of second jigs, said wires will be properly positioned for subsequent attachment to a connector in a second configuration.

3,987,532

ASSEMBLING APPARATUS

Sami Shemtov, Brooklyn, N.Y., assignor to I-T-E Imperial Corporation EFCOR Division, East Farmingdale, N.Y.

Filed Apr. 11, 1975, Ser. No. 567,396
Int. Cl.[2] B23P *19/04*
U.S. Cl. 29—234 9 Claims



1. Apparatus for assembling first and second components in telescoping relationship with each other, said apparatus comprising:

A. a movable plate;

B. a plurality of component support means mounted on said plate for movement together therewith along a predetermined path, said support means being adapted to receive the two components in a partially assembled condition;

C. cam surface means positioned in opposition to the path of said support means, said cam surface means being arranged to engage a first one of the two components during movement of said plate and said support means where said cam surface means bear against the first component and forceably displace the first component into telescoping relationship within the second component; and

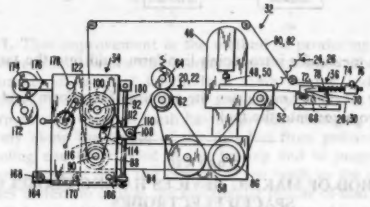
D. each said support means including a post extending outwardly from said plate and spring means for normally biasing said post in an outward direction to permit engagement between said first component and said cam surface means, the two components being loosely seated on said post prior to engaging said cam surface means.

3,987,533

METHOD AND APPARATUS FOR MANUFACTURING SLIDE FASTENER STRINGER WITH IMPROVED FASTENING ELEMENT COUNT

Jan Erik Sandgren, Meadville, Pa., assignor to Textron, Inc., Providence, R.I.

Filed Oct. 20, 1975, Ser. No. 623,911
Int. Cl.² B21D *53/52;* B21F *45/18;* B29D *5/00*
U.S. Cl. 29—410 22 Claims



1. A method of manufacturing a continuous stringer for a slide fastener comprising

advancing a continuous train of fastening elements to an assembly station,

advancing a continuous stringer-tape-forming member to the assembly station,

assembling the train of fastening elements and the stringer-tape-forming member at the assembly station to form a continuous stringer having a carrier tape with the fastening elements secured to one edge of the tape,

advancing the continuous stringer from the assembly station,

sensing the relative quantity of fastening elements per unit length of the tape in the stringer after the assembly station, and

controlling the relative rate of advancement of one of the continuous train of fastening elements and the continuous stringer-tape-forming member to the assembly station in response to the sensing to produce a continuous stringer having a substantially predetermined quantity of fastening elements per unit length of the tape.

9. An apparatus for manufacturing a continuous stringer for a slide fastener comprising

means for assembling a continuous train of fastening elements and a continuous stringer-tape-forming member into a continuous stringer having a carrier tape with the fastening elements secured to one edge of the tape,

first means for advancing the continuous train of fastening elements to the assembly means,

second means for advancing the continuous stringer-tape-forming member to the assembly means,

means for sensing the relative quantity of fastening elements per unit length of the carrier tape in the stringer, and

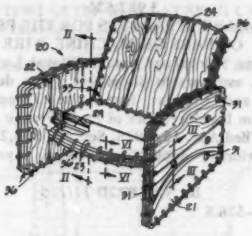
means responsive to the sensing means for controlling one of the first and second advancing means to produce a substantially predetermined quantity of fastening elements per unit length of the carrier tape.

3,987,534

METHOD FOR MAKING A FURNITURE CONSTRUCTION

Donald B. Gold, 260 Canal St., San Rafael, Calif. 94901

Filed Sept. 9, 1974, Ser. No. 504,061
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² B23P *17/00*
U.S. Cl. 29—415 18 Claims



1. A method for making a furniture construction comprising the steps of

forming a flat, circular member,

cutting said member into a plurality of panels along chordal lines thereof to define at least one arcuate edge on each of said panels, and

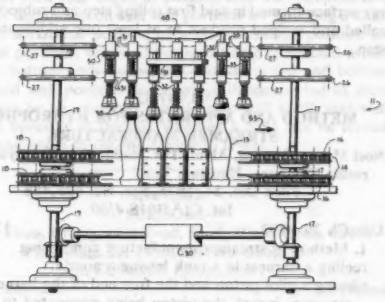
positioning at least some of said panels closely adjacent to each other and releasably attaching said panels one to another to expose at least some of said arcuate edges externally on said furniture construction.

3,987,535

BOTTLE DECAPPING METHOD AND APPARATUS

Winton F. Brown, 313 Alamatos Drive, Danville, Calif. 94526

Filed July 31, 1975, Ser. No. 600,831
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 15 Claims



1. A method of removing from a container a screw cap threadably received on said container covering the mouth thereof wherein said threads on said container are structurally more rigid than said threads on said cap comprising the steps of stripping the threads from said cap by rotating said cap relative to said container while maintaining the threads of said container intact and preventing translational movement of said cap relative to said container along the helix of said cap threads whereby the threads on said container will strip said threads on said cap for said release, and thereafter translationally separating said cap from said container.

7. Decapping apparatus for removing from a container a screw cap threadably received on said container covering the mouth thereof comprising means for preventing for a prede-

termined time translational movement of said cap relative to said container along the helix of said cap threads, means for rotating said cap relative to said container during said predetermined time to thereby strip the threads from one of said container and said cap to release the threaded engagement of said cap with said container, and means for thereafter translationally separating said cap from said container.

3,987,536

METHOD OF AND APPARATUS FOR THE PRODUCTION OF BARS OR MACHINE WIRE

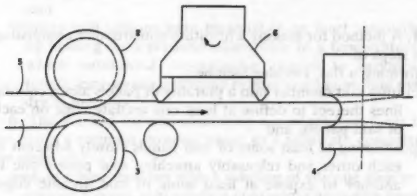
Roger Figueres, Voiron, and Antoine Pitaval, La Tronche, both of France, assignors to Societe de Vente de l'Aluminium Pechiney and Cegedur Societe de Transformation de l'Aluminium Pechiney, both of Paris, France

Filed Apr. 15, 1975, Ser. No. 568,288

Claims priority, application France, Apr. 16, 1974, 74.13123

Int. Cl.² B22D *11/126*

U.S. Cl. 29—526.6 **5 Claims**



1. The method of making continuously cast elongate metallic products comprising the steps of fabricating by continuously casting an elongate metallic article in a grooved casting wheel wherein surface imperfections tend to be concentrated in a localized area adjacent a surface along the length of said article, passing said article through a first rolling step to elevate said localized area and form at least a portion of said area into a convex surface, scalping at least a portion of said convex surface formed in said first rolling step and subjecting said rolled and scalped product to at least one additional rolling step.

3,987,537

METHOD AND APPARATUS FOR HYDROPHONE STREAMER MANUFACTURE

Noel Macon Warren, Alvin, Tex., assignor to Teledyne Exploration Company, Houston, Tex.

Filed Oct. 24, 1975, Ser. No. 625,458

Int. Cl.² H01S *4/00*

U.S. Cl. 29—592 **12 Claims**

1. Method of streamer manufacture comprising

reeling a harness in a tank having a nozzle,

placing a pilot piston and the free end of the harness into a streamer jacket, the piston being connected to the harness end,

connecting the near end of the streamer jacket to the nozzle,

filling the tank with liquiform fluid while the piston is stationary and while venting air from the tank,

causing such fluid to move from the tank into the jacket to move the pilot piston along the jacket while paying out the harness into the jacket, and

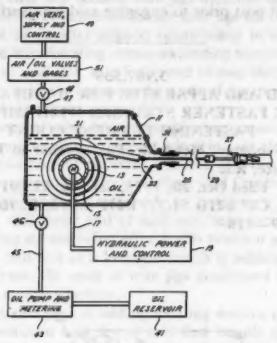
metering such fluid into the tank sufficient so that the tank is full of such fluid despite the movement of such fluid into the jacket.

7. Apparatus for streamer manufacture, comprising:

a tank having a nozzle adapted for attachment of a streamer jacket and with a motor driven harness reel inside the tank,

fluid passage means at the top of the tank for introduction and withdrawal of fluid from the top of the tank,

valve means controlling flow through said fluid passage means,



pump means for introducing liquiform fluid into the tank, and

meter means for measuring the amount of liquiform fluid so introduced into the tank.

3,987,538

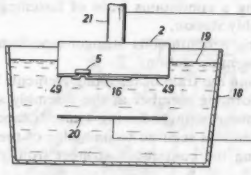
METHOD OF MAKING DEVICES HAVING CLOSELY SPACED ELECTRODES

David George Brown, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 26, 1973, Ser. No. 427,862

Int. Cl.² B01J *17/00*

U.S. Cl. 29—577 **14 Claims**



1. A method of fabricating electrodes of a charge coupled device comprising the steps of:

a. forming regions of one conductivity type in a surface of a semiconductor substrate of opposite conductivity type to provide anodization diodes beneath insulation overlying said surface;

b. forming a first patterned array of parallel, spaced metal electrodes on said insulation in electrical communication with selected ones of said diodes through said insulation with selected ones of said electrodes formed as transverse projections from a first elongated clock line strip electrode formed adjacent said insulation;

c. anodizing surface areas less than the total thickness of said electrodes by passing anodizing current through a circuit including said diodes and said electrodes, said current passing through said diodes solely in a forward direction; and

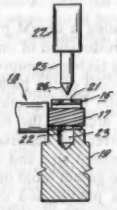
d. forming a second patterned array of parallel spaced metal electrodes on said insulation, selected ones of the electrodes of said second array formed as transverse projections from a second elongated clock line strip electrode formed ajacent said insulation and extending parallel to said first clock line electrode, the electrodes of said second array being interleaved with the electrodes of said

first array, and said anodized surfaces providing insulation between electrodes of said first and second arrays.

3,987,539
METHOD OF MAKING A MOLDED COMMUTATOR
Roy Dennison Gravener, Bethany, Conn., assignor to Consolidated Foods Corporation, Old Greenwich, Conn.
Filed Jan. 31, 1974, Ser. No. 438,186
Int. Cl.² H01R 43/08
U.S. Cl. 29—597 4 Claims

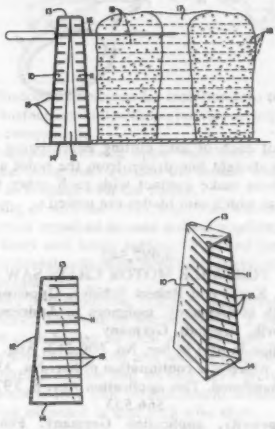
1. That improvement in the method of producing electric motor commutators which comprises forming a tube with a plurality of internal longitudinal teeth having rectangular profiles, passing longitudinally through said tube a mandrel formed with external teeth having profiles changing progressively along the length of the mandrel from pointed at the leading end to rounded at the trailing end to progressively displace metal from the centers of the teeth to the opposite sides thereof to change the rectangular profile of said internal teeth to a profile which is substantially T-shaped in cross-section, locating a bushing of smaller diameter than said tube concentrically within the latter, filling the annular space between said bushing and said tube with plastic molding material to form a hub with said T-shaped teeth embedded and anchored in said material, and slotting said tube longitudinally between said T-shaped teeth to form individual commutator bars.

3,987,540
METHOD OF FORMING A CRIMP-TYPE ELECTRICAL CONNECTOR
Carl E. Gryctko, Haddon Heights, N.J., assignor to I-T-E Imperial Corporation, Spring House, Pa.
Continuation-in-part of Ser. No. 420,432, Nov. 30, 1973, abandoned. This application Mar. 4, 1975, Ser. No. 555,165
Int. Cl.² H01R 43/04
U.S. Cl. 29—630 A 3 Claims



1. A process for producing an electrical connector comprising the steps of inserting an unpierced portion of a stranded cable into a loosely fitted sleeve having diametrically opposed apertures through the walls thereof; crimping said sleeve substantially along the entire length of its longitudinal wall until said sleeve is frictionally held to said portion and formed with opposed and generally flat surface portions along substantially the entire length of the longitudinal wall of said sleeve surrounding said diametrically opposed apertures; and piercing said portion by transverse displacement of the strands of said cable to form a through aperture aligned with said diametrically opposed apertures in said sleeve whereby said aperture and said diametrically opposed apertures form a through passage for fastening means to secure the cable and sleeve to an electrical terminal.

3,987,541
CUTTING GUIDE FOR LAYERED CAKE
Robert A. Sieczkiewicz, 3 Laurel St., North Providence, R.I. 02911
Filed May 15, 1975, Ser. No. 577,689
Int. Cl.² A21C 15/04
U.S. Cl. 30—114 3 Claims

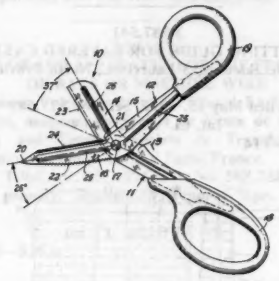


1. A cake cutting guide comprising a pair of vertically positioned generally rectangular wall portions integrally connected at their rear edges to position said wall portions in a V-shape, and means on said wall portions for retaining a knife blade in horizontal position at a predetermined position on said wall portions, said wall portions being connected at the top and bottom ends by integral horizontal top and bottom walls, said wall portions being integrally connected at their rear edges by an upwardly tapered rear wall to tilt said wall portions inwardly at the top, whereby a cake can be turned against the blade to cut the cake into layers.

3,987,542
SCISSORS
Luigi P. Visco, 4 Paugussett Road, Sandy Hook, Conn. 06482
Filed Aug. 22, 1975, Ser. No. 606,834
Int. Cl.² B26B 13/08, 29/04
U.S. Cl. 30—233 6 Claims

1. An angular cutting scissors comprising two mated scissor elements each of which comprises a blade section having a cutting edge, a shank section and a handle section, said scissor elements being pivotally united at a point intermediate their blade and shank sections to cause the cutting edges of the blade sections to engage each other with a cutting action when said handle sections are moved into contact with each other, characterized by said blade sections being flat and free of projections or areas of increased thickness and having their cutting edges inclined from the direction of their respective shanks at an angle of at least about 20°, one of said blades being a lower blade which is adapted to extend beneath a material being cut, is longer than the other or upper blade, and is provided with a pointed piercing tip, and said other or upper blade having its cutting edge inclined at an angle greater than the angle of inclination of the cutting edge of said lower blade

and having a blunt tip which extends above the piercing tip of the lower blade when the blades are in closed position to provide a stop element which limits the extent of penetration of the lower blade into a material being pierced, the angle of



inclination of each of said cutting edges being determined relative to a straight line drawn from the point at which the handle sections make contact with each other through the pivot point at which said blades are united.

3,987,543

PORTABLE MOTOR CHAIN SAW

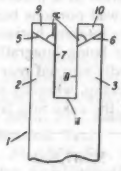
Adolf Rätz, Korb, and Robert Schäfer, Oppenweiler-Aichelbach, both of Germany, assignors to Andreas Stihl Maschinenfabrik, Neustadt, Germany

Continuation-in-part of Ser. No. 500,513, Aug. 26, 1974, abandoned, which is a continuation of Ser. No. 330,725, Feb. 8, 1973, abandoned. This application Apr. 8, 1975, Ser. No. 566,533

Claims priority, application Germany, Feb. 9, 1972, 2206169

Int. Cl.² B27B *17/02*

U.S. Cl. 30—383 **4 Claims**



1. In combination with a guiding track for a portable motor chain saw having chain teeth and a guiding segment for a saw chain that is U-formed in cross section at right angles to the guiding plane and defining shanks between which there is a guiding web engageable by the chain saw members whereby the sides of the shanks directed toward each other form outwardly inclined surfaces forming a groove and are provided at least in a partial range of the guiding track with a highly rigid alloying consisting of a reinforcement layering which is applied upon an outwardly inclined engagement surface upon the particular shank of the guiding track, the improvement thereby which comprises that at least a part of the engagement surface encompasses an angle α of less than 90° with respect to the guiding surface of each shank so that side forces effective upon the chain teeth becomes transformed into a tilt movement which is effective in the groove exclusively in outwardly direction, the entire engagement surface encompassing an angle α of less than 90° with the guiding surface of each shank.

3,987,544

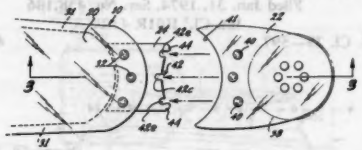
CHAIN SAW GUIDE BAR WITH DETACHABLE NOSE

Duane M. Gibson, Milwaukie, Oreg., assignor to Omark Industries, Inc., Portland, Oreg.

Filed Apr. 30, 1976, Ser. No. 681,897

Int. Cl.² B27B *17/02*

U.S. Cl. 30—384 **4 Claims**



1. A guide bar for a chain saw having a replaceable nose portion comprising a main bar portion, a nose portion, and a web interconnecting the main bar portion and the nose portion, said main bar portion and nose portion having abutting edge and one of the portions including spaced apart side plates and at least one post spanning between the side plates, said web fitting between said side plates and having a slot adapted to accommodate the post and gripping means on at least one of the web and said one portion that provides resistive insertion of the post into the slot for quick connecting and disconnecting of the nose portion to the main bar portion.

3,987,545

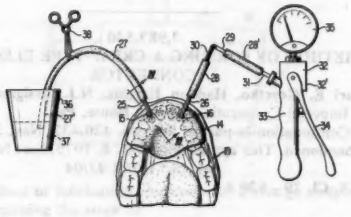
METHOD AND APPARATUS FOR MAKING A DENTAL PROSTHESIS IN SITU

Leland T. Kennedy, Richmond, Va., assignor to IPCO Hospital Supply Corporation (Whaledent International Division), New York, N.Y.

Filed June 2, 1975, Ser. No. 582,813

Int. Cl.² A61C *13/00*

U.S. Cl. 32—2 **8 Claims**



1. A method for forming a dental prosthesis in situ in a patient's mouth for the restoration of one or more missing or broken teeth, comprising taking an impression of the patient's mouth and forming a model of the patient's dentition with a hard setting dental model forming material, correcting the model by filling in the areas of the teeth which are to be restored with model correcting material until the corrected areas conform to the desired size and shape of the restored teeth, forming a negative gasket mold of the tooth areas to be restored, by applying a pliable and curable mold forming elastomeric material over the model and overlapping the boundaries of the tooth areas to be restored in all directions by a predetermined distance, curing the negative mold while it is still on the model, drilling a pair of holes through the gasket mold at opposite ends of the mold cavity, applying a tubular fitting in said pair of holes and connecting a flexible exhaust tube having a filter therein to one of said fittings and a flexible inlet tube to the other of said fittings, cutting down the patient's teeth in the areas to be restored to receive the prosthesis leaving the tooth stumps free of undercuts, coating the tooth stump with an antistick mold lubricant, placing the

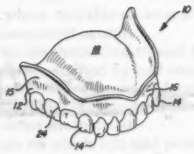
gasket mold assembly in the patient's mouth over the tooth area prepared for restoration with the free ends of the flexible tubes leading outside of the mouth, attaching the free end of the exhaust tube to a vacuum pump, clamping the inlet tube closed intermediate its free end and said gasket mold, operating said vacuum pump to produce a predetermined vacuum in said mold cavity, and testing whether the gasket mold is sealed with respect to the patietn's mouth by observing whether the vacuum will be maintained after a predetermined vacuum has been obtained and the vacuum pumping ceased, releasing the vacuum if the seal is satisfactory, preparing a mix of self curing acrylic liquid resin in a receptacle, inserting the free end of the inlet tube into the mix of self-curing liquid resin while maintaining said inlet tube clamped closed, operating the vacuum pump to obtain a vacuum of substantially 27 inches of mercury or above in said mold cavity, ceasing the operation of the vacuum pump, releasing the clamp from said inlet tube whereupon atmoshperic pressure acting on the liquid resin in said receptacle forces the liquid resin through said inlet tube into said evacuated mold cavity, allowing said liquid acrylic resin to cure into a solid material, and removing said gasket mold, fittings and tubes from the patient's mouth and from said prosthesis.

3,987,546

PROSTHETIC DENTURE AND METHOD OF MAKING SAME

Daniel E. Trampe, 10626 N. 44th Court, Phoenix, Ariz. 85028

Filed Apr. 2, 1975, Ser. No. 564,541
Int. Cl.[2] A61C *13/00*
U.S. Cl. 32—2 **3 Claims**



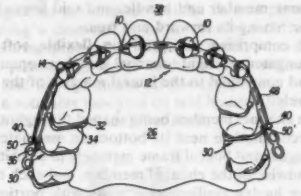
1. The method of manufacturing and fitting a prosthetic denture device comprising:
   a. manufacturing the denture device including the steps of:
      i. placing a plurality of individual artificial acrylic teeth in a mold,
      ii. placing a polymeric material in said mold, said polymeric material when cured having durometer hardness of from 90 to 100 and thermal deformabilty above 120° F,
      iii. forming said polymeric material into a denture base having said teeth embedded therein and conforming to the shape of the human mouth,
      iv. curing said material at a temperature of from about 140° to 200° F, and
      v. cooling said denture and removing from said mold;
   b. fitting said denture including the steps of:
      i. selecting a denture in accordance with the patient's requirements,
      ii. placing said denture in the mouth of the patient to determine the necessary fitting adjustments,
      iii. removing said denture from the patient's mouth and heating the denture base to a temperature of from about 120° to 140° F,
      iv. manually deforming said denture base to conform to the patient's mouth, and
      v. lining the denture base in the area of the edentulous ridge.

3,987,547

ORTHODONTIC APPLIANCE AND METHOD OF ORTHODONTIC TREATMENT

Dan Moss, P.O. 1108, Cedar City, Utah 84720

Filed Apr. 3, 1975, Ser. No. 564,890
Int. Cl.[2] A61C *7/00*
U.S. Cl. 32—14 E **18 Claims**



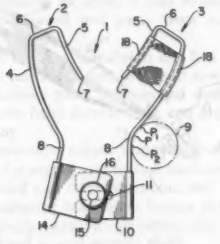
1. An orthodontic appliance for insertion into the mouth of a patient in surface contact with the palate and adjacent to the dental arch comprising:
   a palatal appliance having upper and lower surfaces, said appliance being inserted into the mouth with the upper surface in contact with the palate;
   b. a plurality of wire members, each wire member having a first section attached to said palatal appliance and projecting from said lower surface; a second section straddling the dental arch and a third section extending outside of the dental arch;
   c. a plurality of orthodontic brackets each attached to different teeth disposed in the mouth of a patient, said brackets each having an arch wire slot; and
   d. an arch wire having first and second ends being respectively coupled to first and second third sections of said wire members by a pair of attachment means, said arch wire being disposed in said arch wire slots.

3,987,548

BITE REGISTRATION TRAY AND COMBINATION THEREOF WITH BIB

Russell J. Jones, 13804 Lake Shore Drive, Bratenahl, Ohio 44110

Filed July 3, 1975, Ser. No. 593,104
Int. Cl.[2] A61C *9/00*
U.S. Cl. 32—17 **8 Claims**



1. A bib and bite frame combination for introducing bite registration material between the occlusal surfaces of the teeth comprising:
   a frame of stiff, resilient wire, and having an elongated buccal frame member, an elongated lingual frame member spaced laterally therefrom and generally parallel thereto, and a transverse end frame member at, and connecting, one end of the buccal frame member to one end of the lingual frame member, and disposed at about

a right angle to the lengths of said buccal and lingual frame members;

said buccal and lingual frame members extending forwardly from the end frame member;

said buccal frame member having at its forward end an integral forwardly extending handle, said handle joining the buccal frame member by an integral curvilinear portion of said wire which is convex inwardly from the buccal frame member and handle, and said lingual frame member having its forward end free;

a bib comprising a strip of thin, flexible, soft material and elongated, straight, channel members open at both ends and connected to the lateral margins of the strip, respectively;

each channel member being shaped throughout its length to accommodate near its bottom an associated one of said lingual and buccal frame members in a position extending endwise of the channel member, and each channel member having resilient side walls with portions defining a radially open restricted entry passage which is coextensive endwise with the channel member, the ends of the flexible strip being free;

each channel member being resiliently resistant to flexure transversely of its longitudinal axis so as to conform in contour, in a direction transversely of the frame, with its associated frame member, and being composed of resiliently distortable, self-restoring elastomeric material of which the resiliency and self-restoring characteristics are such as to provide for clamping engagement of the channel members with buccal and lingual frame members, respectively, when the buccal and lingual frame members are inserted radially thereinto through the radial entry passage;

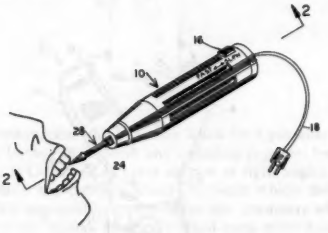
characterized in that the length of said lingual frame member, measured from its free end to the end frame member, is materially shorter than the buccal frame member, measured from said end frame member to the juncture of said buccal frame member and said curvilinear portion, and at least one of said channel members is longer than the lingual frame member.

3,987,549

DENTAL PROPHYLACTIC HANDPIECE

Paul Robertelli, Manhasset, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Oct. 6, 1975, Ser. No. 620,210
Int. Cl.[2] A61C *3/06*
U.S. Cl. 32—59 **6 Claims**



1. A dental prophylactic handpiece comprising in combination:

a hollow elongated housing having motor means mounted therein;

a tool-receiving member mounted rotatably at one end thereof on said housing drivably connected to said motor means;

a non-circular blind opening in the other end of said tool-receiving member, said tool-receiving member at least in the region thereof surrounding said opening being resilient and the inner surface of said opening being provided with circumferential serrations;

and a dental tool detachably secured in said opening comprising a shank, a working tip integral with said shank located at one end thereof and an enlarged portion at the other end of said shank having an external surface of complementary configuration with the opening in said tool-receiving member including peripherally extending serrations thereon, the cross-sectional dimensions of said enlarged portion of the shank being greater than that of the corresponding dimensions of said opening, whereby insertion of said enlarged portion of said shank in said opening with the configurations of the opening and enlarged portion of the shank in aligned relation stresses said region of the tool-receiving member and effectuates a secure gripping of said dental tool therein.

3,987,550

SYSTEM AND APPARATUS FOR DENTAL PROPHYLAXIS

Arthur J. Danne, 13196 E. 6th Place, Aurora, Colo. 80010, and Richard A. Edwards, 5340 S. Oak St., Littleton, Colo. 80123

Continuation-in-part of Ser. No. 254,330, May 17, 1972, abandoned, which is a continuation of Ser. No. 106,648, Jan. 15, 1971, abandoned. This application Apr. 30, 1974, Ser. No. 465,506
Int. Cl.[2] A61C *3/06*
U.S. Cl. 32—59 **27 Claims**

27. In a dental prophylaxis apparatus of the type having a handpiece including means for supporting a rotatable flexible applicator cup and means for supplying prophylaxis treatment material to the interior of the applicator cup, a control system for facilitating uninterrupted prophylaxis treatment which comprises:

drive means for rotating the applicator cup;

reservoir means for holding a quantity of treatment material;

a fluid line for conducting treatment material from said reservoir means to the interior of the applicator cup;

means utilizing fluid pressure for forcing treatment material from said reservoir means through said fluid line to the interior of the applicator cup;

means connectable to a fluid pressure supply for admitting fluid under pressure to said fluid pressure utilizing means; and

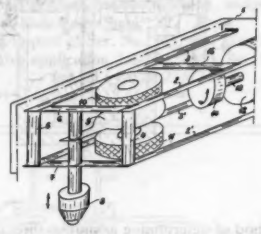
foot controlled means for selectively actuating said drive means to rotate the cup and for effecting operation of said fluid pressure utilizing means to deliver desired quantities of treatment material to the cup, whereby the opeerator's hands are completely free to manipulate the handpiece without interruption and the applicator cup need not be removed from the patient's mouth for material supply purposes.

3,987,551

APPARATUS FOR MEASURING CONTINUOUS OR DISCONTINUOUS SURFACES

Max Kienle, Lausanne, Switzerland, assignor to Tesa S.A., Renens, Switzerland

Continuation of Ser. No. 428,874, Dec. 27, 1973, abandoned. This application May 19, 1975, Ser. No. 578,470
Claims priority, application Switzerland, Jan. 6, 1973, 95/73
Int. Cl.² G01B 7/34
U.S. Cl. 33—169 R 4 Claims



1. A device for measuring the dimensions of workpieces having a continuous or discontinuous surface during the course of machining, comprising a measurement sensor movable in one direction and in the opposite direction,

a. a motor means for the motorized drive of said measurement sensor in one direction and in the opposite direction;

b. a transducer whose movable element is rigidly connected with said measurement sensor,

c. a recording means connected to said transducer for recording the signals emitted by said transducer;

d. a pulse-detector means connected between said transducer and said recording means for controlling the running of said motor means; and

e. a control means on which acts said pulse-detector means, said control means controlling said motor means, whereby said measurement sensor may gradually approach the surface to be measured and enter into contact with it and the dimension measured at the time of contact recorded, and the measurement sensor maintained at the dimension measured and recorded at said time of contact or displaced in the opposite direction for a period of time.

3,987,552

MEASURING APPARATUS

Angelo Raiteri, Ivrea, Italy, assignor to Inductosyn Corporation, Valhalla, N.Y.

Filed July 1, 1974, Ser. No. 485,031
Int. Cl.² G01B 7/12, 7/02
U.S. Cl. 33—178 E 4 Claims

1. Apparatus for measuring a workpiece positioned between a reference point and a measuring probe comprising:

a. a housing fixed in relation to said reference point, said reference point being integral with said housing;

b. a first shaft slidably mounted in said housing for coarse slidable travel toward and away from said reference point;

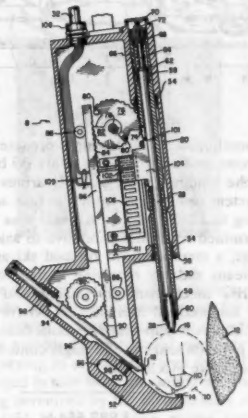
c. a second shaft mounted parallel to said first shaft for fine slidable travel relative to said first shaft toward and away from said reference point, said second shaft having said measuring probe fixed thereto at an end proximal to said reference point;

d. resilient connection means connecting said first and second shafts for urging said second shaft away from said first shaft toward said reference point; and

e. a position measuring transducer having two electrically coupled relatively movable elements, one of said elements being fixed to said second shaft; and

f. a positioning probe on a positioning shaft slidably mounted in said housing, and mechanical linkage means connecting said second and positioning shafts for maintaining said positioning probe substantially in a plane with said measuring probe and reference point and substantially tangent to an imaginary circle in said plane, said circle having a diameter equal to the distance between said measuring probe and reference point; wherein said first and positioning shafts each have a toothed rack thereon, said linkage means further comprising:

a first pinion rotatably mounted on said housing for engagement with the rack on said first shaft;



a linkage shaft slidably mounted within said housing and having two toothed racks thereon;

a second pinion rotatably mounted on said housing concentric with and fixed to said first pinion for engagement with one of the racks on said linkage shaft; and

a third pinion rotatably mounted on said housing for engagement with the other rack on said linkage shaft and the rack on said positioning shaft.

3. Apparatus for measuring a workpiece positioned between a reference point and a measuring probe comprising:

a. a housing fixed in relation to said reference point;

b. a first shaft slidably mounted in said housing for coarse slidable travel toward and away from said reference point;

c. a second shaft mounted parallel to said first shaft for fine slidable travel relative to said first shaft toward and away from said reference point, said second shaft having said measuring probe fixed thereto at an end proximal to said reference point;

d. resilient connection means connecting said first and second shafts for urging said second shaft away from said first shaft toward said reference point; and

e. a position measuring transducer having two electrically coupled relatively movable elements, one of said elements being fixed to said second shaft;

wherein the application of a force to the first shaft moves the second shaft and moves the measuring probe into contact with said workpiece and the continued application of said force causes the second shaft to travel relative to said first shaft in a direction opposed to the urging of said resilient connection means, said apparatus further comprising:

releasable means for exerting a force upon the first and second shafts and for providing a predetermined limited amount of travel of said second shaft relative to said first

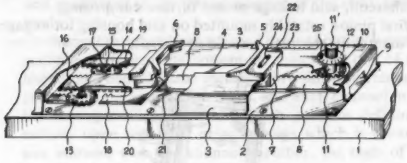
shaft during said continued application of force after said measuring probe has contacted said workpiece.

3,987,553

ADJUSTABLE SAFETY SKI BINDING SYSTEM

Georges Pierre Joseph Salomon, 34 Avenue de Loverchy, Annecy (Haute-Savoie), France

Division of Ser. No. 287,072, Sept. 7, 1972, Pat. No. 3,857,186. This application Nov. 18, 1974, Ser. No. 524,545
Int. Cl.[2] B43L 9/08; A63C 9/00
U.S. Cl. 33—192 11 Claims



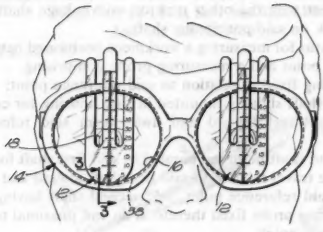
1. In combination, a ski having a predetermined reference point thereon, and an adjustable safety ski binding system for adapting the binding to the size of various skier boots, said binding system comprising: front and rear adjustable jaws for maintaining said boot on said ski, said jaws being disposed in a predetermined relationship relative to said reference point on said ski; a member fixed on said ski and provided with guiding means slidably receiving therein each said jaw; an inverse drive mechanism connecting said jaws and acting along the longitudinal axis of said ski for moving simultaneously said jaws in opposite directions from and towards said reference point on said ski; and single control means operating said inverse drive mechanism.

3,987,554

SEGMENT MEASURING GAUGE

Jimmy Pastore, 6990 Kern Drive, Rubidoux, Calif. 92509

Filed July 7, 1975, Ser. No. 593,659
Int. Cl.[2] A61B 3/10
U.S. Cl. 33—200 4 Claims



1. A segment measuring gauge for ophthalic frames comprising:

a planar base member having a lower edge formed of a smooth continuous surface and an upper portion;

a plurality of fingers extending vertically from said upper portion when said base member lower edge is inserted in the bottom lens groove of a pair of ophthalic frames; and

a scale formed on said gauge extending from adjacent said base member lower edge towards said vertically extending fingers;

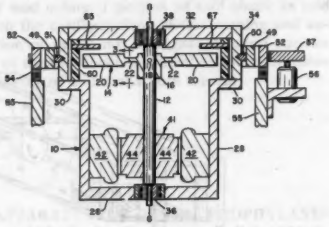
said base member and said fingers being formed of a single piece of integrally formed transparent flexible material for enabling said fingers to extend from the plane of said base member at varying intersecting angles and interleave an edge of said frame.

3,987,555

GYROSCOPIC SYSTEM AND METHOD OF DETERMINING DIRECTION

Robert G. Haagens, Walpole, and Argyle Lautzenhiser, Magnolia, both of Mass., assignors to The Laitram Corporation, New Orleans, La.

Filed Apr. 9, 1971, Ser. No. 132,799
Int. Cl.[2] G01C 19/28
U.S. Cl. 33—324 13 Claims



1. A method of determining azimuthal direction relative to the earth rotation axis utilizing a gyroscope comprising a support and a rotor mounted on the support for rotation about a spin axis, said rotor including a wheel mounted on a single axis torsional suspension for rotation about a torsional axis perpendicular to said spin axis, said method comprising the steps of:

suspending said gyroscope with said spin axis oriented in a direction ranging from parallel with the direction of local gravity to perpendicular to the earth rotation axis;

rotating said rotor about said spin axis at the resonant frequency of said torsional suspension;

producing electrical signals proportional to the torsional rotation of said rotor about two orthogonal output axes substantially in the mean rotational plane of said wheel; and

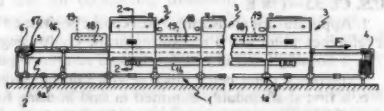
algebraically summing said signals to produce an output signal which is substantially nulled when said output axes are angularly oriented at 45° with respect to the true north-south meridian.

3,987,556

APPARATUS FOR DRYING HIDES AND SKINS

Olivier Tissot, Saint Mury, Meyland (Isere), and Irenee Catalo, Avenue de L'Egalite, Graulhet (Tarn), both of France

Filed Apr. 17, 1973, Ser. No. 351,988
Claims priority, application France, Apr. 26, 1972, 72.15764
Int. Cl.[2] F26B 13/10
U.S. Cl. 34—155 6 Claims



1. A drier for drying articles of low dimensional stability such as hides and skins by heating the articles while supporting them upon their epidermal surfaces and then subjecting them to hot air currents of predetermined humidity, comprising:

at least one non-porous support on which the articles to be dried are arranged on their epidermal surfaces;

means for heating said support prior to arrangement of the articles thereon;

at least one impingement chamber having means for passing a current of pressurized air thereinto and directing the air upon the unsupported surfaces of the articles at a high flow-rate, other means for heating this current of air, a casing situated at the base of said chamber below the support to extract the damp air contained in the chamber, and an outlet tunnel from the chamber; and

means for conveying the support into the chamber.

3,987,557

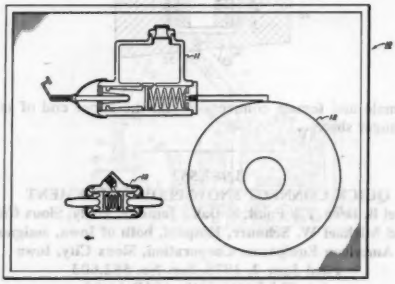
EDUCATIONAL DEVICE FOR LEARNING THE FUNDAMENTALS OF AN AUTOMOTIVE DRUM BRAKE SYSTEM

Charles Glenn Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 345,920, March 29, 1973, abandoned. This application July 30, 1973, Ser. No. 383,845

Int. Cl.² G09B *25/02*

U.S. Cl. 35—13 **8 Claims**



1. An educational kit for teaching the assembly, relationship of parts, and operation of an automotive drum brake system comprising:

a. a simulator board having a surface of magnetically attractive material and having (i) on a first area of said board graphic indicia on the surface thereof defining a sectional view of an automotive drum; (ii) on a second area of said board graphic indicia defining a wheel cylinder; and (iii) on a third area of said board graphic indicia defining an automotive master cylinder, all three areas of said board being educationally integratable in teaching a drum brake assembly, the indicia on said simulator board being as shown by the non-numerical indicia of FIG. 1;

b. a plurality of magnetically attractive manipulative pieces each bearing individually on their surfaces graphic indicia defining items found within an automotive drum brake assembly, said pieces comprising (i) a plurality of pieces each containing indicia defining elements found within an automotive drum brake assembly; and (ii) a plurality of pieces each containing word indicia defining various segments of an automotive drum brake system, the pieces being adapted for manipulation within the confines of the three defined areas of the simulator board, the indicia on said manipulative pieces being as shown by the non-numerical indicia of FIGS. 3 and 4;

c. a display board for said manipulative pieces including a sheet of magnetically attractive material, said display board having graphic indicia on a surface thereof in spaced relationship, said graphic indicia corresponding to the indicia present on each of said manipulative pieces, said manipulative pieces adapted for storage on and removal from said display board; and

d. audiovisual instructional means for presenting information relevant to the basic principles about automotive drum brake systems including information defining (i) the first, second, and third areas of said board, (ii) the indicia on the manipulative pieces, (iii) the indicia on said board, (iv) the relationship of the indicia on the three areas of the simulator board to the indicia on said pieces and use of same on said board whereby the assembly, relationship of parts, and operation of an automotive drum brake can be learned by the user by using said board in response to said instructional means.

3,987,558

DEVICE FOR PRODUCING A BLOCK-BUILT PICTURE

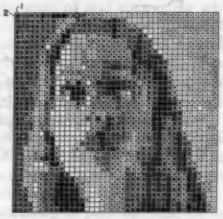
Shouji Tsukamoto, 10-14, Daikanyama, Shibuya, Tokyo, Japan

Filed June 19, 1972, Ser. No. 264,287

Claims priority, application Japan, June 18, 1971, 46-51652; June 18, 1971, 46-51653; Sept. 8, 1971, 46-80949

Int. Cl.² G09B *1/10*

U.S. Cl. 35—27 **1 Claim**



1. A device for producing a block-built picture comprising a plurality of blocks and block mounting means for supporting said blocks in a regular arrangement along coordinate axes, said blocks being provided with pictoral elements of a common shape but varying in at least the area thereof to define, upon being mounted in said block mounting means, a picture adapted for being perceived by the areal density of said pictoral elements, said block mounting means comprising a board, said board and blocks including and being provided with pins and bores, said blocks being adapted to be removably mounted on said board by engagement of said pins and bores, said pins being carried by said board and arranged regularly along rectangular coordinates, said blocks each being formed with said bores at respective faces thereof, said blocks being cubes each with six different observation faces having respectively different pictoral elements.

3,987,559

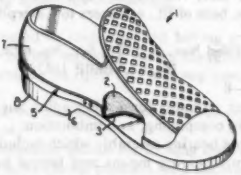
FOOT TREATMENT SHOE AND METHOD OF USING SAME

Edith V. Roberts, 2009 S. 19th, Kansas City, Kans. 66106

Filed Apr. 12, 1976, Ser. No. 675,700

Int. Cl.² A43B *7/30*

U.S. Cl. 36—95 **10 Claims**



1. A foot treatment shoe comprising:

a. a sole member and a side wall extending upwardly therefrom and defining an interior bottom wall and side wall having interior foot engaging surfaces capable of enclosing a foot therein; and

b. a fine abrasive surface on selected interior foot engaging surfaces of the bottom wall and the side wall and engageable with the foot therein.

3,987,560

DEVICE FOR ASSEMBLING A BUCKET ON A FRAME

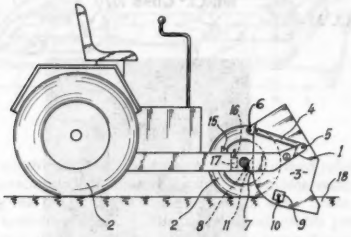
Jean E. Leroux, Lagny-le-Sec, France, assignor to Societe Anonyme: Poclain, Le Plessis-Belleville, France

Filed July 14, 1975, Ser. No. 595,436

Claims priority, application France, July 22, 1974, 74.25378

Int. Cl.² E02F 5/00

U.S. Cl. 37—4 10 Claims



1. An earthworking vehicle including a front-to-rear extending frame, a bucket, first selectively activatable pivot means for selectively providing a pivotal connection between said bucket and said frame for permitting said bucket to pivot about a first pivot axis between a generally horizontal load-carrying position on the forward end of said frame and an excavating or loading position in which a forward portion of the bucket is near or below ground level forwardly of the vehicle, second selectively activatable pivot means for selectively providing a second pivotal connection between said bucket and said frame for permitting said bucket to pivot about a second pivot axis between said generally horizontal load-carrying position and an unloading position in which said forward portion of the bucket is in a downward position forwardly of the vehicle but is spaced above ground level to permit the flow of material from the bucket onto the ground surface and bucket tilting power means for pivoting said bucket between said generally horizontal load carrying position and said excavating or loading position when said first selectively activatable pivot means is activated and between said generally horizontal load carrying position and said unloading position when said second selectively activatable pivot means is activated.

3,987,561

AUGER MOUNTING FOR AUGER SCRAPER

James Edgar Gee, Washington, and Robert Norris Stedman, Chillicothe, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 3, 1975, Ser. No. 628,023

Int. Cl.² B60P 1/42

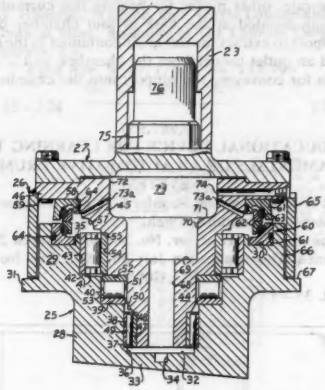
U.S. Cl. 37—8 15 Claims

1. An auger assembly for a self-loading auger scraper bowl, said assembly comprising, in combination:

a supporting bearing assembly which includes a lower housing, thrust bearing means and lateral bearing means in said lower housing, an upper housing rotatably supported in said bearing means and closing the upper end of said bearing assembly, and annular lubricant sealing means between said housings, said bearing assembly being fixedly mounted at the bottom of the bowl,

an auger having a shaft the lower end of which makes a non-rotatable male and female connection with the closed upper end of said bearing assembly;

and a hydraulic motor mounted at the top of the bowl, said motor having an output shaft that makes a non-rotatable



male and female connection with the upper end of said auger shaft.

3,987,562

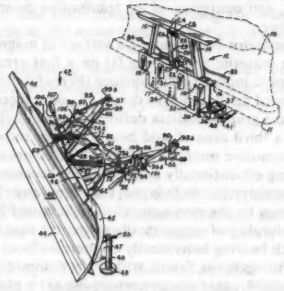
QUICK CONNECT SNOW PLOW IMPLEMENT

Darrel B. Deen, Elk Point, S. Dak.; James E. Hrdy, Sioux City, and Michael W. Schnurr, Hospers, both of Iowa, assignors to American Equipment Corporation, Sioux City, Iowa

Filed June 2, 1975, Ser. No. 582,603

Int. Cl.² E01H 5/08; A01B 51/00

U.S. Cl. 37—42 R 3 Claims



1. In snow plow apparatus for removable coupling with a vehicle, which apparatus includes a frame for mounting on the vehicle, the frame having a pair of laterally spaced hitch pins, a push frame having a plow on one end and a pair of fork-like members on the other end having notches for registry with said pins, the improvement comprising:

a pair of jaws, one for each notch, said jaws pivotally mounted to said fork-like members for movement between an open position permitting insertion of the pins in the notches and a closed position wherein the jaws and notches cooperate to retain the hitch pins in the notches, said jaws having camming surfaces operable in response to movement of the hitch pins toward and into the notches to pivot the jaws toward their closed positions,

link means interconnecting each jaw with said push frame and operable to effect the movement of said jaws, said link means including a pair of hand levers, one for each jaw, connected with the link means and spaced away from

said jaws to a position intermediate the plow and fork-like members, said hand levers operable to manipulate said link means to move said jaws between the open and closed positions, and

automatic locking means connected with said link means for automatically locking each said link means against further movement in response to movement of its respective jaw to the closed position.

3,987,563

EXCAVATOR

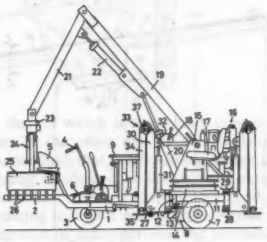
Anton Baur, Ehingen, Donau, Germany, assignor to Hans Boos, Lohhof, Germany

Filed Dec. 13, 1974, Ser. No. 532,564

Claims priority, application Germany, Dec. 15, 1973, 2362483

Int. Cl.² E02F 9/00; B66C 23/62

U.S. Cl. 37—73 20 Claims



1. An excavator comprising a basic frame, an independently operable excavating mechanism on said basic frame, at least three folding articulated legs on said basic frame for supporting said basic frame, each said folding articulated leg comprising a first limb, and a second limb, means interconnecting said first limb and said basic frame for pivoting said first limb in both vertical and horizontal directions, a lockable joint including clamp means with a horizontal axis connecting said first limb and said second limb, and rotatable means for rotating said independently operable excavating mechanism through 360°.

3,987,564

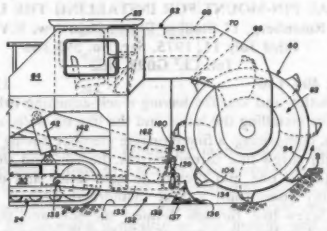
OUTSIDE SUPPORTS FOR EXCAVATING WHEELS

Charles R. Satterwhite, Dallas, Tex., assignor to Unit Rig & Equipment Co., Tulsa, Okla.

Continuation-in-part of Ser. No. 435,296, Jan. 21, 1974, Pat. No. 3,896,571. This application July 17, 1975, Ser. No. 596,576

Int. Cl.² E02F 3/24

U.S. Cl. 37—190 13 Claims



1. An excavating and loading system comprising in combination:

a vehicle including a main frame and a subframe;

means supporting the main frame of the vehicle for movement over a surface;

excavating wheel means for forming an excavation including a plurality of digging buckets located immediately adjacent one another to define the entire circumference of the excavating wheel and each having a cutting edge which extends to a stationary wall and a wall mounted for pivotal movement from a material receiving position to a material dumping position, each end of said excavating wheel means defining a side wall and an outer rim extending axially beyond the side wall, said rims of the excavating wheel means being wider than the vehicle;

supporting and housing means on the vehicle supported from the subframe and supporting said excavating wheel means in the front of the vehicle, said supporting and housing means including portions engaging and rotatably supporting the ends of said excavating wheel means and extending vertically upwardly in the space between the side walls and the rims to portions extending outwardly beyond said rims whereby the distance between the lowest point on said outwardly extending portions and the lowest digging level of said excavating wheel means defines the maximum excavation depths;

means for selectively varying the relative positioning of said subframe and said main frame whereby said excavating wheel means can be selectively raised or lowered to excavate at various depths;

drive means extending in part through the supporting and housing means for rotating the excavating wheel means so that the digging buckets follow a circular path;

means located within the margins of the excavating wheel means and responsive to rotation thereof for positively positioning the movable wall of each digging bucket in the material dumping position when the bucket is in the upper and rearward portion of the path; and

conveyor means mounted on the vehicle entirely behind the excavating wheel assembly for movement around a course including a relatively low portion positioned to receive material from the digging buckets of the excavating wheel means and the material dumping position relatively high and located rearwardly on the vehicle.

3,987,565

INDEXING APPARATUS

Chuzo Mori, Tokyo, Japan, assignor to Carl Maufacturing Company Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 415,974, Nov. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 198,257, Nov. 11, 1971, abandoned. This application Sept. 25, 1974, Ser. No. 509,232

Claims priority, application Japan, Dec. 11, 1970, 45-123642; Dec. 11, 1970, 45-123643; Dec. 11, 1970, 45-123644

Int. Cl.² G09F 11/06

U.S. Cl. 40—104.01 4 Claims

1. An indexing apparatus comprising:

a base;

a cover connected to said base and having a slot therein, said cover having indexing marks thereon, said cover being movable to an open and a closed position relative to the base;

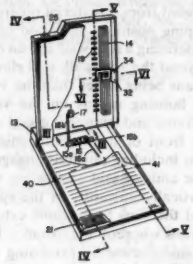
biasing means for normally biasing the cover toward its open position;

locking and unlocking means for locking the cover relative to the base in its closed position, and allowing the cover to move under the force of the biasing means to its open position;

a plurality of cards on said base, certain ones of said cards being associated with corresponding certain ones of said indexing marks;

indexing means comprising an indexing member movable along said slot to select indexing marks, said indexing member having a pair of spaced legs extending through

the slot and terminating in outwardly directed feet, said indexing means further comprising a slider defining a top, a bottom, and a web connecting the top and bottom, and means for securing the slider to the indexing member, cards from said plurality thereof being disposed above said bottom, said top defining a ridge cooperating with



recesses defined by the cover holding said indexing means at a selected one of said indexing marks, said bottom holding cards from the plurality thereof upon movement of the cover to its open position,

wherein said slider top defines an opening defining inner opening edges and wherein said feet engage the inner edges of the opening defined by the slider top.

3,987,566

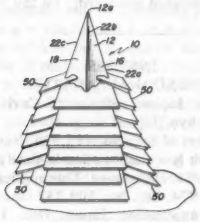
CARD DISPLAY DEVICE

Anthony J. March, 2 S. 173 Stratford Road, Glen Ellyn, Ill. 60137

Filed Oct. 20, 1975, Ser. No. 623,674

Int. Cl.² G09F 1/08

U.S. Cl. 40—124.4 **1 Claim**



1. A one-piece, collapsible device for holding greeting cards to provide a tree-like display, comprising: a one-piece, self-supporting, hollow body portion having four triangularly-shaped sidewalls and no bottom wall, said sidewalls being joined to one another along their lateral margins to impart a pyramidal configuration to the body portion when it is in an upright, non-collapsed position, the base or lower margin of each of the sidewalls being adapted to rest on a supporting surface and to maintain the body portion in an upright, non-callapsed position, said body portion being collapsible into a non-card supporting condition along any opposed two of said lateral margins to bring the two sidewalls on each side of said two opposed margins into flattened, overlying relation with respect to one another, a plurality of spaced, inwardly and upwardly extending slots formed in the sidewalls along the lateral margins thereof, the slots in each of the sidewalls intersecting at their outermost end the slots formed in the next adjacent sidewalls to provide continuous slots extending from one sidewall to the next adjacent sidewall through the lateral margins thereof, and a transverse fold line formed in each sidewall between the base and the upper end or apex thereof, said transverse fold line being positioned at the same level in each sidewall and intersecting the inner end of two laterally opposed slots formed along the lateral margins of the same sidewall, the fold lines and the slots intersected thereby of any two adjacent sidewalls enabling the area of said two sidewalls above the fold lines to be folded into overlying relation with respect to area thereof below the fold lines when the body portion is in its collapsed, non-card supporting condition.

3,987,567

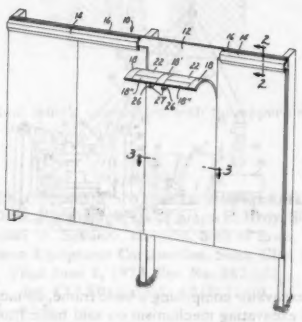
FLEXIBLE COPY SECTION

Robert W. Fritts, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 189,292, Oct. 14, 1971, abandoned. This application May 7, 1973, Ser. No. 357,813

Int. Cl.² G09F 7/04

U.S. Cl. 40—125 F **5 Claims**



1. A flexible copy section having particular utility as a component in a rotatable copy display used on a signboard and characterized by having sufficient flexibility to permit it to be simultaneously peeled from the signboard and rolled up for storage and transport and to permit it to be unrolled onto the signboard for display, said copy section comprising:

a rectangular, thermally dimensionally stable, flexible sheet of plastic;

first and second flexible magnet strips secured to the backside of said sheet, disposed one along and coterminal with each longitudinal edge of said sheet;

flexible filler pad means secured to the backside of said sheet in all areas between said magnet strips and having the same uniform thickness as the magnet strips; and

a flexible film secured to and coterminal with the front side of said sheet providing weather resistance for and display of indicia.

3,987,568

LETTER AND THE LIKE HAVING A SELF-ADJUSTING ORBITAL PIN-MOUNT FOR INSTALLING THE LETTER

Jerome Rosenberg, 11 Stauber Drive, Plainview, N.Y. 11803

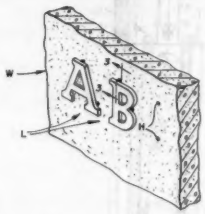
Filed July 11, 1975, Ser. No. 595,166

Int. Cl.² G09F 7/02

U.S. Cl. 40—140 **12 Claims**

1. A letter and the like having a self-adjusting orbital pin-mount for installing the letter and the like on walls and other surfaces, comprising: a first elongate member having opposite ends with screw-like thread means thereon and threadably connected at one end thereof to said letter and extending rearwardly therefrom, a first cylindrical adapter member having screw-like threads defined thereon and threadably connected to the other end of said first elongate member, a laterally and angularly yieldable coupling means having opposite ends, said coupling means being hollow and essentially cylindrical and having an inside diameter approximately equal

to, but slightly larger than, the outside diameter of said first elongate member, said coupling means having one end thereof threadably coupled to the threads on the other end of said first adapter member to connect said coupling means to the other end of the first member in a manner such that said coupling means is permitted to flex while being reinforced by said first elongate member, a second cylindrical adapter member having screw-like threads defined thereon and threadably connected to the other end of said coupling means, and a second elongate member having an outside diameter approximately equal to, but slightly smaller than, the inside diameter of said coupling means and having screw-like thread means on at



least one end thereof which is threadably connected to said coupling means at the other end of the yieldable coupling means in a manner such that said coupling means is permitted to flex while being reinforced by said second elongate member, said second member being adapted to extend at its other end into a mounting hole in a wall or other surface to secure the letter to the wall or other surface, the yieldable coupling means connecting said letter to said wall and being reinforced by said elongate members to have sufficient rigidity so that the letter can be applied and secured by hand pressure applied to the letter to a wall or other surface without creating excessive stress or damage to the letter or mounting pin, even in the event of misaligned mounting holes.

3,987,569

ADHESIVE PICTURE MOUNT

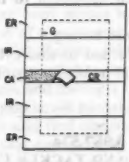
Marston Chase, 1330 New Hampshire Ave. NW., Washington, D.C. 20036

Continuation of Ser. No. 452,554, March 19, 1974, Pat. No. 3,893,252, which is a continuation of Ser. No. 877,583, Nov. 26, 1969, abandoned, which is a division of Ser. No. 690,858, Dec. 15, 1967, Pat. No. 3,517,106. This application May 30, 1975, Ser. No. 582,156

The portion of the term of this patent subsequent to July 8, 1992, has been disclaimed.

Int. Cl.² G09F *1/10*

U.S. Cl. 40—158 R **2 Claims**



1. An adhesive picture mount for mounting pictures or the like comprising a base of a size to accommodate a picture to be mounted with or without a surrounding mat, a layer of pressure sensitive adhesive is provided on at least one face of the base for securing a picture to the mount, and a cover release sheet releasably retained on the adhesive, said cover release sheet comprising at least three separable sections each release sheet section extending completely across the mount and being removable as a unit to expose a section of the underlying adhesive, one of said release sheet sections being narrow and of a width so as to expose only a minor portion of the pressure sensitive adhesive in a narrow section completely across the base upon a removal of the one sheet section, the remaining sheet sections being so orientated relative to said one sheet section, and hence the adhesive section exposed by the removal thereof, as to retain an overlying picture supported thereon out of direct pressure contact with the exposed adhesive section until such time as the picture is manually depressed below the plane of the remaining sheet sections and into direct contact with the exposed adhesive section for securemnt thereto whereby the picture and mount can be moved relatively to each other in overlying relation for accurate positioning until in final desired position, said exposed adhesive section being of a width so as to accommodate a manually depressed portion of the picture, said remaining sheet sections being removable subsequent to securement of the picture to the exposed adhesive section.

3,987,570

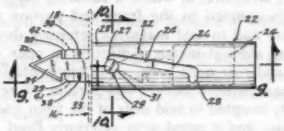
EAR TAG

Herman J. McMurray, deceased, late of Newton, Iowa, by William C. Eastland, executor, Des Moines, Iowa, assignors to Dorothy A. Eastland, Des Moines, Iowa

Continuation-in-part of Ser. No. 461,093, April 15, 1974, abandoned. This application June 19, 1975, Ser. No. 588,311

Int. Cl.² G09F *3/00*

U.S. Cl. 40—301 **5 Claims**



1. The combination of an animal ear tag and an applicator therefor wherein:

I. The tag comprises:

a. a flat body member composed of a plastic material including a neck section projected outwardly from one side thereof having a lateral extension normal to the plane of the flat body member with a terminal locking portion thereon, and

II. The applicator comprises:

a. a cylindrical tubular housing open at one end,

b. a plunger axially movable within said housing,

c. a flat knife member having a front cutting section and a rear section,

d. means securing said rear section to said plunger for movement of the knife member therewith to retracted and extended positions of said cutting section relative to said one end of the housing, and

e. means on said knife member adjacent said cutting section for releasably holding said locking portion of the tag in longitudinal alignment with said housing, when the cutting section is in the extended position therefor and with the neck section extended transversely of the housing adjacent said one end thereof for engagement with said one end on movement of the cutting section to the retracted position therefor,

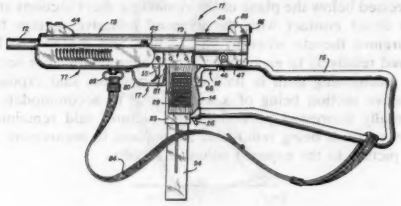
f. said locking portion, on insertion of said cutting section through an animal's ear to form a slit therein, being moved through said slit to the side of the ear remote from said neck section by said holding means and then released from the holding means on movement of the cutting section to the retracted position therefor.

3,987,571

PORTABLE SUBMACHINE GUN

Hector Mendoza Orozco, Adolfo Prieto 1709, Mexico 12, D. F., Mexico

Division of Ser. No. 433,162, Jan. 14, 1974, Pat. No. 3,906,833. This application June 30, 1975, Ser. No. 591,567
Claims priority, application Mexico, Jan. 31, 1973, 141299
Int. Cl.² F41C 23/00
U.S. Cl. 42—71 R 1 Claim



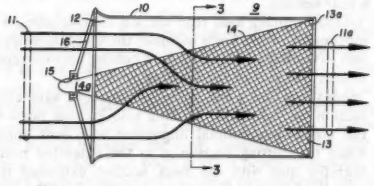
1. A portable submachine gun comprising a support structure having upper and lower edges and front and rear ends and exteriorly including a pair of opposite slots at said front end; firing and safety means attached to said support structure; a retaining device for a magazine attached to said support structure; a stock attached to the rear end of the support structure and to said magazine retaining device; a barrel attached to said support structure and having a cartridge receiving chamber at one end; and a bolt slidingly mounted on said barrel and having guide means removably attached to the rear end of said support structure; in which a handling support means is removably coupled to the front end portion of said support structure and to said magazine retaining device; and a said handling support means comprises an open cover including upper and rear open ends, a rail plate interiorly included in said open cover in its rear end portion whereby said cover is slidingly coupled in said slots of the front end of the support structure, and a metal strip exteriorly fixed to the rear end portion of said open cover, said metal strip being free at one of its end portions and slightly bent whereby the handling support means is coupled to the magazine retaining device.

3,987,572

TIDAL OPERATED PLANKTON HARVESTER

Albert H. Bieser, Garland; Eric L. Rognlie, Dallas, and William B. Stuhler, Plano, all of Tex., assignors to Plankton Resources, Inc., Garland, Tex.

Filed May 15, 1975, Ser. No. 577,647
Int. Cl.² A01K 71/00
U.S. Cl. 43—4.5 8 Claims



7. The method of harvesting plankton comprising:

a. directing tidal flow through a perforate surface of a suitable size to deposit plankton thereon as said flow passes through said perforate surface,

b. in response to said flow moving said surface periodically, subjecting said surface to suction to unload solids from said surface, and

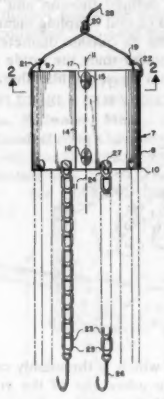
c. storing said solids.

3,987,573

RETRIEVER FOR SNAGGED FISHING LURES

Abner W. Clayton, P.O. Box 13165, San Antonic, Tex. 78213

Filed May 19, 1975, Ser. No. 578,638
Int. Cl.² A01K 97/00
U.S. Cl. 43—17.2 6 Claims



1. A device for retrieving a snagged fishing lure attached to a fishing line comprising:

a. an elongated cylindrical body having an inner surface and an outer surface and a top end and a bottom end, said elongated cylindrical body adapted to encompass a fishing line,

b. said elongated cylindrical body comprising a cylinder projecting on a central axis,

c. line guide means for slidably securing the device around a fishing line positioned in the vicinity of said elongated central axis, said line guide means further comprising:

1. an upper line guide projecting inward from the interior surface of said cylindrical body terminating in a line loop bend arching in a first direction at substantially the central axis of said cylindrical body,

2. a lower line guide projecting inward from the interior surface of said cylindrical body terminating in a line loop bend arching in a second direction at substantially the central axis of said cylindrical body,

d. a line slot constructed in the said elongated cylindrical body, said line slot extending from the top end to the bottom of said elongated cylindrical body, said line slot being positioned in said cylinder on a line in projection of said upper line guide and said lower line guide, said line slot being positioned parallel to said upper line guide and said lower line guide,

e. a hook snaring chain appended to the said elongated cylindrical body,

f. said hook snaring chain having:

1. a secured end attached to said cylindrical body, the opposite end of said hook snaring chain constituting,

2. a loose end.

3,987,574

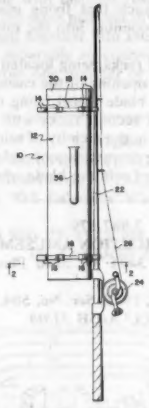
FISHING ROD AND TACKLE CARRIER

Peter Pennino, Oak Park, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Sept. 8, 1975, Ser. No. 611,444
Int. Cl.² A01K 97/08
U.S. Cl. 43—26 2 Claims

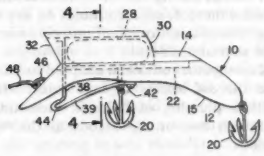
1. A carrier device for a plurality of fishing rods and fishing tackle comprising: an elongated cylindrical container for holding tackle; plural clasp means projecting radially outward from said container in angularly spaced apart relationship;

each said clasp means being configured for engaging a fishing rod and for maintaining said fishing rod directed longitudinally along the periphery of said container; a closure means at



one end of said container; and a handle means projecting radially and fixedly from said container at a location angularly intermediate two of said clasp means.

3,987,575
FISHING LURE
Toshio Morita, Toronto, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest
Filed Sept. 15, 1975, Ser. No. 613,632
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.06 **5 Claims**



1. A fishing lure device comprising an elongated main lure body means, hook means carried by said main lure body means for hooking a fish, leader engaging means carried by the front of said main lure body means for selected engagement with a leader for manipulating the fishing lure in the water, said main lure body means having a chamber formed therein for reception of a container of a liquid for discharge therefrom for luring fish thereto, said chamber extending in a direction substantially parallel to the longitudinal axis of said main lure body means and having a first opening of a size for insertion therein of said liquid container and a second opening therein spaced from said first opening of a size for discharge of said liquid from said container by the flow of surrounding water through said main lure body from said first to second openings entraining liquid discharged from said container, but of insufficient size to enable said container to pass therethrough, and spring lever detent means mounted on said main lure body means retractable and insertable in said chamber adjacent said first opening for selectively locking and blocking said opening for insertion and withdrawal of said liquid container and for holding said container in said chamber, said spring lever detent means including a resilient planar spring member having a lower arm portion attached to the bottom of said main lure body and an upstanding arm portion connected to said lower arm portion for reciprocating movement in a direction substantially perpendicular to the lure body axis by a finger engageable middle portion, said upstanding arm portion normally extending through said main lure body means into said chamber to block the first opening in said chamber.

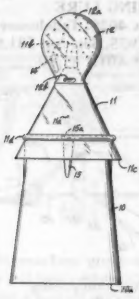
3,987,576
FISHING LURE
James W. Strader, P.O. Box 4029, Tallahassee, Fla. 32303
Filed May 29, 1975, Ser. No. 581,823
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.16 **3 Claims**

1. An improved fishing lure comprising:
a thin, elongated, flexible shaft;
a pair of connectors, one connected at either of the opposite ends of the shaft;
a swivel means connected to one of the connectors at the forward end of the shaft;
said swivel means adapted to be attached to a conventional fishing line;
a shaft asymmetrical torque inducing means connected to said flexible shaft;
a weight connected around said shaft forward of said asymmetrical torque inducing means;
weight covering means disposed about said weight for providing a noise maker, said covering means connected around said shaft and including a hollow chamber portion adjacent said weight;
a plurality of separating means separating said weight and said asymmetrical torque inducing means and movable along said shaft;
a hook connected to the opposite end of said shaft from said swivel means;
artificial bait means connected about said hook; and
a weed guard means connected to said hook and movable from a first position adjacent said hook point to a second position away from said hook point, said weight covering means being so constructed and arranged to act as both a sound chamber and as a weed separator preventing the fouling of the forward portions of the lure.

3,987,577
BOLL WEEVIL TRAP
Dicky D. Hardee, Starkville, Miss., assignor to Story Chemical Corporation, Muskegon, Mich.
Filed July 8, 1975, Ser. No. 593,979
Int. Cl.² A01M *1/02*
U.S. Cl. 43—121 **4 Claims**

1. Apparatus comprising support means, open-ended hollow guiding means releasably mounted on the upper end of said support means, perforated hollow trapping means detachably affixed at its open lower end to about the open upper end of said guiding means, said guiding means being adapted at about its open lower end to be releasably attached to the upper end of said support means to provide an annular space between the outside of said support means and the inside of the open lower end of said guiding means, the opening provided at the upper end of said guiding means being substantially smaller than the opening provided at the lower end of said guiding means, the opening at the upper end of said guiding means extending into said trapping means, said support means being frustum shaped and hollow and wherein the

upper end of said support means is closed and its lower end is open, said support means being made of plastic material with the outside surface of the support means being colored or painted daylight fluorescent yellow, said guiding means and said trapping means being perforated and made of transparent plastic material, said guiding means being substantially funnel shaped with the smaller upper opening of said guiding means



extending substantially within the interior of said hollow trapping means, said hollow trapping means being spherical or bulbous in shape and wherein material containing the male boll weevil aggregating pheromone, grandlure, is provided within the hollow interior space within said trapping means defined therein by the upper end of said guiding means extending within said trapping means and the inside surface of said trapping means.

3,987,578

DEVICE FOR THE DESTRUCTION OF FLYING INSECTS, ESPECIALLY IN CLOSED ROOMS

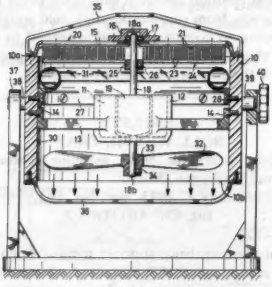
Claude Rueff, Av.Alte.Barroso, 63 - grupo 2113, 20.000 Rio de Janeiro R.J., Brazil

Filed Aug. 1, 1975, Ser. No. 601,568

Claims priority, application Switzerland, Aug. 5, 1974, 21040/74

Int. Cl.² A01M *1/06*

U.S. Cl. 43—139 **7 Claims**



1. An apparatus for destroying flying insects, comprising:

a. a casing having an intake opening and an outlet opening at opposite ends thereof;

b. a motor housed in said casing and having a shaft which extends between the two openings of the casing;

c. a first rack of teeth mounted on the rotatable shaft of the motor;

d. a second rack of teeth stationarily mounted across an opening of the casing and positioned such that the teeth of the first rack, when rotated, pass between the teeth of the second rack to effect a cooperative chopping action which destroys flying insects drawn between the racks; and

e. a fan blade wheel mounted on the rotatable shaft of the motor for producing a current of air between the openings of the casing such that flying insects are drawn through said intake opening into the range of action of the racks,

f. said first and second racks being located in said housing adjacent said intake opening of the casing, and

g. said motor and fan blade wheel being mounted underneath said first and second racks with said fan blade wheel being located in the vicinity of said outlet opening and said motor being downstream of said first and second racks and upstream of said fan blade wheel.

3,987,579

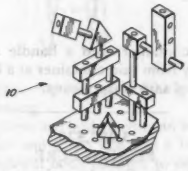
FREE-FORM CONSTRUCTION AMUSEMENT DEVICE

Joseph A. Palenik, III, 3431 W. 53rd Place, Chicago, Ill. 60632

Filed June 9, 1975, Ser. No. 584,715

Int. Cl.² A63H *33/08*

U.S. Cl. 46—16 **7 Claims**



1. A construction amusement device of the character described comprising:

a foundation board having a plurality of holes formed therein, said holes being arranged in rows and columns with unit spacing between adjacent holes;

a plurality of blocks having one or more holes formed in at least two sides thereof, adjacent holes on any one of said sides being spaced apart one-half unit or a whole number multiple of said unit; and

a plurality of connector rods each adapted to be received at either end thereof in any of said holes, whereby said blocks with a plurality of holes in their sides may be connected with two or more rods to the board or to another block.

3,987,580

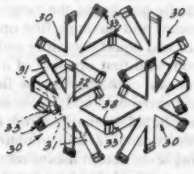
SEPARABLY CONNECTIVE FLEXIBLE TOY

Steven Ausnit, 124 E. 61st St., New York, N.Y. 10035

Filed July 17, 1975, Ser. No. 596,645

Int. Cl.² A63H *33/08*

U.S. Cl. 46—25 **14 Claims**



1. A separably connective flexible toy, comprising: a plurality of generally flat geometric flexible toy members with each toy member having a plurality of radial arms each of substantially uniform width along its length with com-

plementary fastener rib and groove fastener means at the distal end of each arm,

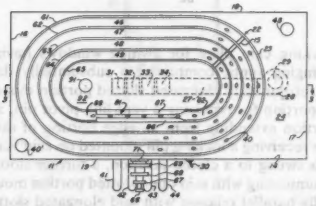
each of said arms being bendable and twistable along its length, said fastener ribs and grooves of the arm ends interlockable with fastener ribs and grooves of another arm end of the same member or of another member being easily pressed together into interlocked relation and being readily separable to connect and to disconnect the members from one another or the arm ends from each other.

3,987,581

CONTROLLED MULTIPLE TRACK TOY SYSTEM WITH MODULAR ATTACHMENTS

Paul L. Brown, 982 Lakeview Way, Redwood City, Calif. 94062

Filed May 27, 1975, Ser. No. 580,602
Int. Cl.² A63H *29/16*
U.S. Cl. 46—44 **8 Claims**



1. A controlled multiple track toy system with modular attachments comprising a housing, a top on said housing, an endless track defining a plurality of endless lanes delineated on said top, a plurality of air jet holes in said top of which some of the holes are vertically arranged through said top and some thereof are inclined in one direction from the vertical and some thereof are inclined in the opposite direction from the vertical, all of said air jet holes communicating with the interior of said housing, a plurality of modular attachments removably disposable in a plurality of areas about said top: each of said modular attachments having an opening therein aligning with said vertically arranged air jet holes, a modular object supported on each of said modular attachments; each of said modular objects having an aperture therein communicating with the opening in said modular attachment on which it is supported, a movable object removably disposable in each lane of said endless track, means for causing air to flow through said housing and to emanate under pressure from said air jet holes to impinge upon said plurality of modular objects and movable objects to move the same in relation to said top, and a plurality of independently movable control means for selectively varying the volume and pressure of air impinging upon selected ones of said plurality of modular and movable objects to vary the speeds thereof as a group and singly.

3,987,582

GRANDMOTHER WITH GRANDCHILD DOLL ON A STAND

Earnestine J. Williams, R.D. No. 2 4640 Middle Road, Horseheads, N.Y. 14845

Filed Sept. 29, 1975, Ser. No. 617,936
Int. Cl.² F16M *11/16*
U.S. Cl. 46—116 **1 Claim**

1. In a supported doll assembly, the combination of a doll unit consisting of an upright relatively larger doll representing a grandmother, and a relatively smaller doll representing a grandchild, said doll unit being supported in upstanding position on a stand slipped around a lower end of said grandmother doll in a hidden manner, wherein said grandmother doll includes a body with arms and legs, a head with face and hair, said grandchild doll includes a body and head with face, said grandchild doll being held in the arms of said grandmother doll; said grandmother doll being clothed in a dress, and apron, and said grandchild doll being clothed in a bonnet and kimona, wherein said stand comprises two spring steel wires each having at its longitudinal center a semi-circular

loop, said loops being generally coplanar and positioned adjacent each other to form a circular loop, said wires being twisted together adjacent said circular loop so to form united twisted portions extending toward the same side of the plane of said circular loops, the ends of said wires extending upwardly and converging into two separate pairs, each said pair being joined to a respective pad, said grandmother doll body being grasped between said pads.

3,987,583

APPARATUS AND METHOD FOR PREVENTING PREMATURE SEPARATION OF SEPALS OF FLOWER BUDS

George S. Takeyasu, 1750 Hecker Pass Highway, Gilroy, Calif. 95020

Filed Sept. 17, 1975, Ser. No. 614,011
Int. Cl.² A01G *13/04*
U.S. Cl. 47—29 **11 Claims**

1. An apparatus for preventing premature and uneven separation of the sepals of flower buds comprising a hollow substantially conical cap of light transmitting material adapted to rest downwardly over a flower bud in circumscribing relation to the sepals thereof, said cap having a longitudinal axis and a side wall which converges at an angle of from approximately 5° to 10° with the axis.

3,987,584

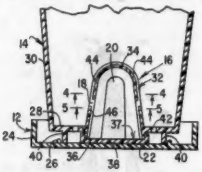
PLANTERS UNIT WITH MEANS FOR FERTILIZING THE SOIL

Bernard Yellin, 5252 S. Kolmar Ave., Chicago, Ill. 60521

Filed Nov. 10, 1975, Ser. No. 630,146
Int. Cl.² A01G *9/02*
U.S. Cl. 47—34 R **9 Claims**

1. A planters unit having a container having a continuous side wall and a bottom wall for receiving soil and the like, and a pan below said container, said container having a drain

opening in said bottom wall to said pan, a fertilizer chamber extending into the interior of said container and having at least one opening therein upwardly spaced from said drain opening and communicating with the interior of said container, said fertilizer chamber being otherwise imperforate and adapted to



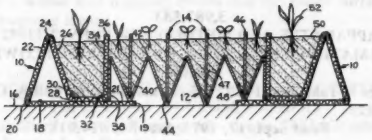
contain fertilizing means therein so that the liquid poured on the soil within the container enters the fertilizer chamber through said chamber opening and contacts the fertilizing means and then passes outwardly of the fertilizer chamber and into the soil in said container for fertilizing the soil.

3,987,585

MODULAR CHANNEL CULTURE DEVICE

George Greenbaum, 790 Boylston St., Boston, Mass. 02199

Filed Oct. 23, 1975, Ser. No. 625,254
Int. Cl.[2] A01G 9/00
U.S. Cl. 47—34.13 11 Claims



1. A modular channel culture device comprising, in combination:

a center support member comprising a sheet of material folded longitudinally to form alternately-inclined segments connected by parallel linear upper and lower reverse bends, said center support member terminating in lateral edges parallel to said reverse bends;

a pair of edge support members each comprising a sheet of material folded longitudinally into the form of at least one triangular prism and having segments including a base and two inclined side walls, said side walls converging upwardly and meeting in a linear apex bend, said base segment extending in one lateral direction beyond its intersection with one of said inclined side walls to form an extended edge portion;

said edge support members being arranged in laterally-spaced relation, with said base segments thereof resting on a supporting surface, said apex bends thereof spaced above said supporting surface and being substantially parallel to one another, and said extended edge portions thereof in mutually-confronting relation;

said center support member being received between said edge support members with said lower reverse bends thereof resting on said supporting surface and on said extended edge portions of said edge support members, and said upper reverse bends thereof spaced above said supporting surface and extending in substantial parallelism to said apex bends of said edge support members;

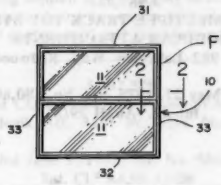
said modular device forming at least one longitudinal soil channel therein adapted to receive and support plant growth medium and plants, having sufficient strength and rigidity when assembled to support the weight of said medium and plants, and being constructed and arranged to be joined in longitudinally-contacting relation with like modular devices to form a channel culture device extending to any desired length in the direction of said apex bends.

3,987,586

LOCKING CAM FOR AWNING WINDOWS

Morton S. Rifkin, 50 E. 10th Court, Hialeah, Fla. 33012

Filed Aug. 25, 1975, Ser. No. 607,349
Int. Cl.[2] E05C 19/02
U.S. Cl. 49—394 2 Claims



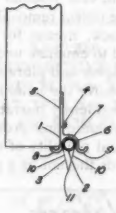
1. A locking cam plate for awning windows having outwardly swinging vents, comprising a substantially flat body portion, a substantially elongated slotted portion mounted on said body portion for receiving a vent link pivot pin, an open slotted portion extending from an edge portion of said body portion for receiving a locking pin mounted on said vent when said vent is swung to a closed position, a further slotted portion communicating with said open slotted portion mounted in substantially parallel relation with said elongated slotted portion for receiving said locking pin upon the vent arriving at its locked position, said further slotted portion forming a lip portion adapted to engage said locking pin to prevent the swinging of said vent to an open position and bridge means joining said lip portion and said body portion extending over and in substantially spaced relation to said slotted portion for strengthening said lip portion.

3,987,587

COLD AIR DRAFT PREVENTION DEVICE

Spencer J. Miller, 1165 Ruberta Ave., Glendale, Calif. 91201

Filed Sept. 29, 1975, Ser. No. 617,705
Int. Cl.[2] E06B 7/23
U.S. Cl. 49—493 4 Claims



1. A door bottom draft prevention device comprising in combination an elongate mounting strip, a pair of flanges extending along an edge portion of said device and having continuously curved convex external surfaces facing away from said mounting strip, means providing an elongate channel located centrally between said flanges and having an internal arc greater than 180° and an elongate opening facing away from said mounting strip, both sides of said channel with said internal arc blending at said elongate opening into said continuously curved convex external surfaces of said flanges, a circular cross-section member in said channel, a flexible strip extending about, and being retained in said channel by, said

circular cross-section member, and a double walled curtain formed adjacent said channel and flanges by portions of said flexible strip extending from said channel adjacent to each of said flanges.

3,987,588

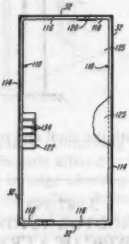
METAL DOOR ASSEMBLY AND METHOD OF PRODUCTION

Raymond E. Imperial; Edward G. Schultz, Jr., and George Scott Hull, all of Richmond, Ind., assignors to Johnson Sheet Metal Works Corporation, Richmond, Ind.

Continuation-in-part of Ser. No. 416,883, Nov. 19, 1973, Pat. No. 3,885,351. This application Apr. 3, 1975, Ser. No. 564,826

Int. Cl.² E06B *3/16*; **E04C** *2/34*

U.S. Cl. 49—501 **17 Claims**



1. An improved metal door or panel assembly comprising a rigid metal rectangular frame including a set of opposing generally C-shaped frame sections each having a longitudinally extending frame member integrally connecting parallel spaced laterally extending frame members, means for rigidly connecting said frame sections to form said frame, a set of generally rectangular sheet metal side panels each having outer peripherally extending edge portions, a thermal insulation material disposed within said frame between said side panels, and means for connecting said edge portions of said side panels to said frame members around said frame for restricting outward movement of said frame members, and said side panels.

3,987,589

VACUUM ATTACHMENT FOR ABRADING MACHINE

Miksa Marton, 3620 Rankin St., Windsor, Ontario, Canada

Continuation-in-part of Ser. No. 362,855, May 22, 1973, abandoned, and a continuation-in-part of Ser. No. 524,799, Nov. 18, 1974, Pat. No. 3,935,678, which is a continuation of Ser. No. 304,412, Nov. 7, 1972, abandoned. This application Mar. 3, 1975, Ser. No. 554,700

Claims priority, application Canada, Aug. 2, 1972, 148535

Int. Cl.² B24B *23/02*, *55/06*

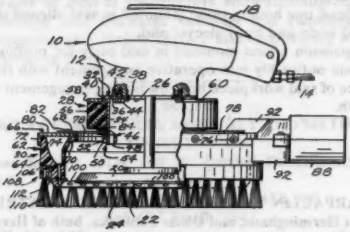
U.S. Cl. 51—170 T **15 Claims**

1. For an abrader having a housing from which a rotatable work head protrudes, a vacuuming means for collecting material abraded from a work surface addressed by the work head, said vacuuming means including:

housing means defining a hollow, generally toroidal vacuum chamber having vacuum inlet conduit for connection to a vacuum source;

means defining a plurality of small angularly spaced, generally downwardly and inwardly directed openings into the vacuum chamber; and

a mounting assembly for mounting the vacuum chamber on the abrader housing to surround the work head, with said openings proximate both the working surface and the periphery of the working head, the mounting assembly including means constituted by a flexible ring intercalating with a portion of the vacuum chamber housing means and permitting limited axial and rocking of the vacuum chamber with respect to the abrader housing and unlimited rotation of the vacuum chamber with respect to the abrader housing.



3,987,590

METHODS OF FABRICATING THERMONUCLEAR FUEL ELEMENTS

Russell R. Chianelli, Brooklyn, N.Y., assignor to University of Rochester, Rochester, N.Y.

Filed Feb. 5, 1975, Ser. No. 547,143

Int. Cl.² B24B *1/00*; **G21C** *21/02*

U.S. Cl. 51—323 **12 Claims**

1. The method of making nuclear fuel elements for use in laser fusion apparatus comprising the steps of

a. selecting bodies of peritectic material consisting of a compound of deuterium and at least one other element, and

b. grinding said bodies until said bodies are formed into pellets of substantially spherical shape and of final size from 75 to 250 microns diameter.

3,987,591

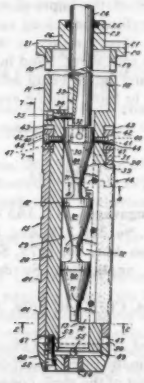
HONING TOOL WITH REVERSIBLE BODY SLEEVE

Albin Stanley Czubak, Holland, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.

Filed Jan. 26, 1976, Ser. No. 652,258

Int. Cl.² B24B *33/08*

U.S. Cl. 51—338 **15 Claims**



1. In a honing tool, the combination comprising:

a. an elongated body constructed for rotational movement about a longitudinal axis in a bore of a workpiece and for reciprocation in said bore, and having a longitudinal chamber formed therein, and at least one radial and longitudinally extended slot formed in said body and

communicating with said chamber and the exterior of said body;

b. a body sleeve mounted on said body and having at least one radial and longitudinally extended slot formed therethrough and aligned with said slot in said body;

c. at least one honing stone mounted in said aligned slots in said body and body sleeve; and,

d. expansion means mounted in said body for pushing said stone outwardly into operative engagement with the surface of said workpiece bore for honing engagement therewith.

3,987,592

TARPAULIN WITH EDGE REINFORCING STRIP

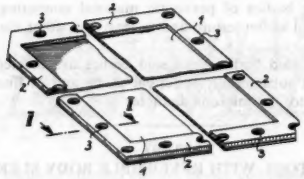
Hellmut Herminghaus, and Dieter Jablonka, both of Herdecke, Germany, assignors to Ewald Dorken AG, Herdecke, Germany

Filed Oct. 30, 1974, Ser. No. 519,197

Claims priority, application Germany, Nov. 9, 1973, 2356028

Int. Cl.² E04B *1/00*

U.S. Cl. 52—3 8 Claims



1. In a tarpaulin composed of a flexible sheet provided with flexible edge reinforcing strips fastened to the sheet along the entire periphery thereof, the improvement wherein the strips are provided with perforations along each edge of said sheet and said sheet is free of perforations so that said edge reinforcing strips form, with said sheet, blind holes in the area of the perforations, the blind holes being adapted to be punched through as required to form holding eyes.

3,987,593

POSTS

Lars Svensson, Vikingavagen 112, 183 43 Taby, Sweden

Continuation of Ser. No. 389,319, Aug. 17, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,991

Claims priority, application Sweden, Aug. 25, 1972, 11016/72

Int. Cl.² E04C *3/04, 3/29*

U.S. Cl. 52—98 4 Claims

1. A yieldable post comprising a closed tubular shell and a plurality of longitudinally extending rods each having a length generally equal to that of the shell, connected to said shell, the shell and rods both having ability to take up tensile as well as compression stresses and to form together a statically cooperating unit, wherein the rods are weld connected to the shell at a plurality of spaced-apart discrete locations along their respective lengths and wherein the connections between the shell and rods being breakable under a predetermined transverse and locally acting vehicle impact load to break the cooperation between shell and rods and to thereby allow

yielding of the post with the shell and rods yielding separately in the zone of impact.

3,987,594

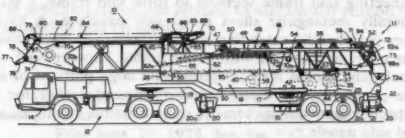
SYSTEM AND METHOD FOR AUTOMATIC UNSTOWING AND STOWING OF A CRANE BOOM

Kamlaker P. Rao, Aurora; William L. Lowe, Naperville, and O. Thomas Nephew, Geneva, all of Ill., assignors to Clark Equipment Company, Buchanan, Mich.

Filed Feb. 6, 1975, Ser. No. 547,679

Int. Cl.² E04H *12/34*

U.S. Cl. 52—111 37 Claims



1. For a large material handling apparatus including a crane superstructure and a crane boom assembly, a system for unstowing and stowing the boom assembly with respect to the superstructure, the system comprising:

means provided on the superstructure for supporting the boom assembly when the boom assembly is in an initial stowed position, the boom assembly including a boom foot portion at one end thereof and a boom nose portion at an opposite end thereof, said boom foot portion disposed remotely from the crane superstructure when the boom assembly is mounted thereon in the stowed position,

first power means for translating the crane boom assembly from the stowed position to an intermediate unstowed position, the boom foot portion disposed adjacent the superstructure when the boom assembly is in the intermediate unstowed position,

guide means for maintaining the orientation of the boom assembly as it is translated from a stowed position to an intermediate unstowed position,

means for pivotally mounting the boom assembly on the superstructure when the boom assembly has been translated from the stowed position to the intermediate unstowed position, and

second power means for lifting the boom from the intermediate unstowed position to a fully unstowed or inclined working position, said second power means also being

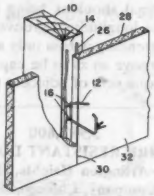
operable to return the boom assembly from the intermediate unstowed position to the initial stowed position.

3,987,595

REMOVABLE WALLBOARD TIE

Jack A. Dawdy, Kenmore, and Rodney G. Buergin, Snyder, both of N.Y., assignors to National Gypsum Company, Buffalo, N.Y.

Filed June 11, 1975, Ser. No. 585,972
Int. Cl.² E04B 2/00
U.S. Cl. 52—127 10 Claims



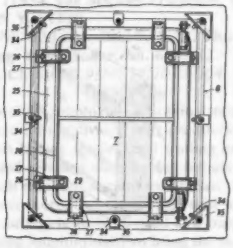
1. A wall construction comprising an elongate framing member and two wallboards affixed to said framing member, said wallboards being in edge abutting coplanar relationship with a joint between said wallboards disposed over said framing member, and means holding said wallboards relative to said framing member consisting essentially of a pair of spaced apart metal fasteners, fastened to the face of said framing member and disposed between said wallboards and said framing member face, a removable tie wire held against the said face of said framing member by said pair of fasteners and an elongate rigid member disposed over the said wallboard joint, said rigid member being held in place by the ends of said tie wire which extend from said fasteners through said joint and engage said rigid member, urging said wallboard edges against said framing member.

3,987,596

FODDER SILO

Johann Wolf, Scharnstein, (Oberosterreich), Austria, assignor to Johann Wolf Gesellschaft m.b.H. KG, Scharnstein, (Oberosterreich), Austria

Filed Jan. 29, 1976, Ser. No. 653,458
Claims priority, application Austria, Feb. 3, 1975, 87767/75
Int. Cl.² E04H 7/26
U.S. Cl. 52—196 22 Claims



1. A fodder silo, which comprises

a concrete wall formed with at least one discharge opening and having an outside surface and an inside surface formed with a recess which surrounds said discharge opening,

a door frame extending in said recess and having corners and a peripherally extending door abutment,

a door disposed in said discharge opening and engaging said door abutment, and

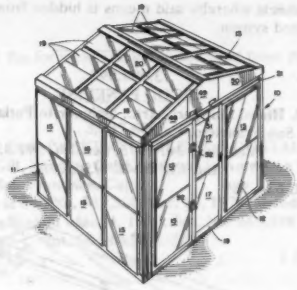
frame-clamping means for forcing said door frame into said recess and comprising clamping pins carried by said door frame at least at said corners and extending outwardly through said discharge opening, and clamping plates engaging said outside surface and cooperating with said clamping pins.

3,987,597

MODULAR STRUCTURAL ASSEMBLY AND METHOD OF CONSTRUCTION

Thomas J. Smrt, 31W 300 W. Bartlett Road, Bartlett, Ill. 60103

Filed Jan. 26, 1976, Ser. No. 652,505
Int. Cl.² E04B 1/347
U.S. Cl. 52—495 9 Claims



1. A modular structural assembly comprising an outer frame, a plurality of panels, and a plurality of clips for releasably securing the panels to the outer frame, the outer frame including a plurality of spaced-apart frame members, each panel comprising four struts connected to form a generally rectangular panel frame and a sheet secured to the struts, each strut including an elongated body and a longitudinally extending flange extending outwardly from the body, the sheet of each panel being folded over the flanges of the panel and being secured thereto, the clips being secured to the frame members and frictionally engaging the flanges of the panels.

3,987,598

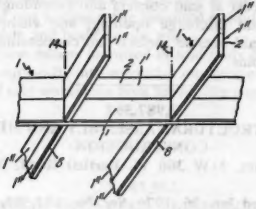
PANEL SYSTEM CONSTRUCTION AND PANELS THEREFOR

Willem Rijnders, Alblasserdam, Netherlands, assignor to Hunter Douglas International N.V., Curacao, Netherlands Antilles

Division of Ser. No. 363,967, May 25, 1973, Pat. No. 3,906,697. This application Mar. 14, 1975, Ser. No. 558,271
Claims priority, application Netherlands, May 29, 1972, 7207264
Int. Cl.² E04C 1/10
U.S. Cl. 52—584 11 Claims

1. A panel system construction comprising at least two panels, each of said panels having two facing sheets and at least two parallel elongated connecting members for holding said sheets in spaced substantially parallel planes on opposite sides of said connecting member; an opening through each of said connecting members, said panels being arranged in substantially the same plane with one edge of each of said panels abutting an edge of the other; said panels being arranged in said plane in such manner that the longitudinal axes of elongated connecting members of one panel are in substantially longitudinal alignment with the longitudinal axes of elongated connecting members of another of said panels; means engaged in the opening of a connecting member of one of said panels

and also in the opening of a longitudinally aligned connecting member of an adjacent panel to hold said panels together in edge-to-edge relationship; and said means being disposed

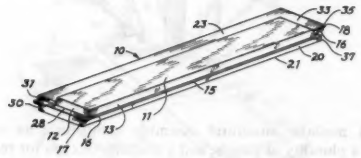


entirely between said substantially parallel planes of said facing sheets whereby said means is hidden from view in the completed system.

3,987,599
WOOD PANELING

John H. Hines, Stuttgart, Ark., assignor to Potlatch Corporation, San Francisco, Calif.

Filed June 30, 1975, Ser. No. 591,335
Int. Cl.² E04C *1/30, 2/10*
U.S. Cl. 52—589 **3 Claims**



1. A wood paneling product comprising:

individual longitudinal panel pieces of solid wood adapted to be joined end to end and side to side to form a parallel wall surface;

each panel piece having a face bounded at opposite sides and opposite ends by finished side and end surfaces having equal thickness in a dimension perpendicular to the face, the thickness of the finished side and end surfaces being less than the total thickness of the panel piece;

a longitudinal groove running uninterrupted along the length of each panel piece at one side thereof, the longitudinal groove having planar side walls parallel to one another and to the face surface, one side wall of the longitudinal groove intersecting the adjacent finished side surface bounding the face of the panel piece and defining the thickness thereof, the remaining side wall of the longitudinal groove being parallel to and spaced inwardly from the back surface of the panel piece and extending inward to the bottom of the groove, the back surface of the panel piece being terminated along a longitudinal abutment extending inward to the longitudinal groove at a location inward from the intersection of the one side wall of the longitudinal groove and the adjacent finished side surface of the panel piece;

and a longitudinal tongue running uninterrupted along the length of each panel piece at the remaining side thereof, the longitudinal tongue having planar sides parallel to one another and to the face surface one side of the longitudinal tongue being coplanar with the one side wall of the longitudinal groove and intersecting the adjacent finished side surface to define the thickness thereof, the remaining side of the longitudinal tongue being substantially coplanar with the remaining side wall of the longitudinal groove, the back surface of the panel piece forming a shoulder leading to the tongue at a location outward from the intersection of the one side of the longitudinal tongue and the adjacent finished side surface of the panel piece;

said longitudinal groove having a bottom wall perpendicular to the side walls thereof;

said longitudinal tongue having an outer wall perpendicular to the sides thereof;

the effective depth of the longitudinal groove being less than the effective depth of the longitudinal tongue, whereby the respective face of each panel piece, when assembled within a parallel wall surface, will be spaced to the side of one another;

a small longitudinal shoulder being formed between one side wall of the longitudinal groove and the bottom wall thereof and extending across only a small fraction of the longitudinal groove so as to be capable of yielding when required by expansion of adjacent panel pieces.

3,987,600
FIRE RESISTANT DOORS

Donald O. Baehr, Arlington Heights, Ill., assignor to United States Gypsum Company, Chicago, Ill.

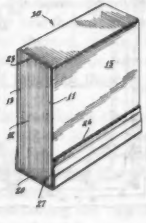
Filed Dec. 10, 1975, Ser. No. 639,496
Int. Cl.² E04C *2/00, 2/34;* **E04B** *2/28*
U.S. Cl. 52—615 **10 Claims**

1. A fire resisting door comprising a framework of stiles and rails, a core of thermally insulating material within the framework, and at least one outer facing sheet covering the core and framework; the improvement comprising said stiles and rails of said framework containing a gypsum matrix reinforced with layers of (a) a plurality of continuous glass fiber rovings set parallel to the length of the framework, and (b) alternating spaced apart layerings of glass fiber mat.

3,987,601
METHOD FOR COVERING A BOOK WITH A SINGLE SHEET

Donald W. Watson, Arlington Heights, Ill., assignor to Xerox Corporation, Stamford, Conn.

Filed May 19, 1975, Ser. No. 578,850
Int. Cl.² B65B *13/02*
U.S. Cl. 53—3 **5 Claims**



1. A method for manufacturing a book having a security cover, comprising the steps of:

a. aligning a stack of sheets to provide an edge surface;

b. fixing a protective sheet to an area, adjacent said edge surface, on the first sheet of the stack;

c. fixing an adhesive binding strip to the sheets along said edge surface, to the protective sheet and to the last sheet of the stack;

d. wrapping the protective sheet around the edge of the stack opposite said edge surface and around the outside of the binding strip; and

e. fixing the protective sheet onto itself.

3,987,602

METHOD AND APPARATUS FOR PACKAGING SMELTABLE OR FLUID MATERIAL

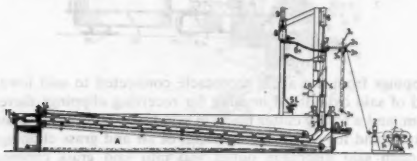
Margarete Stahl, Rheinweg 105, D-53 Bonn, Germany

Filed Mar. 21, 1975, Ser. No. 560,746

Claims priority, application Germany, Mar. 21, 1974, 2413575

Int. Cl.² B65B *1/02, 1/06, 43/36*

U.S. Cl. 53—25 **8 Claims**



1. A method for packaging smeltable or fluid material in flexible synthetic foil containers resistant to water and to the material to be packaged, including the steps of:

a. forming flexible foil into tubular shape;

b. sealing the tubular shape by a longitudinal seam;

c. closing the leading end of the tube so formed;

d. immersing in a cooling bath substantially all of a first portion of the tube to be filled with the smeltable or fluid material;

e. filling the tube with air under pressure;

f. introducing the smeltable or fluid material while in its fluid state into the said first portion, the material after its introduction being situated below the surface of the cooling bath;

g. closing the trailing end of the said first portion of the tube and the leading end of the next portion of the tube to be filled; and

h. continuously feeding the chain of successive filled portions of the tube through the cooling bath.

3,987,603

BAGGING PROCESS

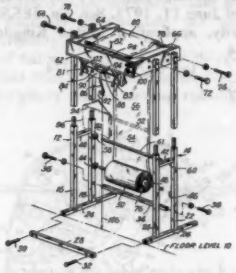
Murray Jelling, 21 Spring Hill Road, Roslyn Heights, N.Y. 11577; Alexander Kahn, 30 E. Bayview Ave., Massapequa, N.Y. 11758; Ernest George Moore, 1630 Paula Lane, East Meadow, N.Y. 11554, and Michael Friedman, 1178 E. 23rd St., Brooklyn, N.Y. 11210

Division of Ser. No. 530,201, Dec. 9, 1974. This application Aug. 8, 1975, Ser. No. 603,012

Int. Cl.² B65B *9/14, 25/20, 57/04*

U.S. Cl. 53—29 **9 Claims**

1. A bagging process employing a braking mechanism and an elongated flatted tubing divided into a sequence of detachable sections, each having leading and trailing ends, by lines of perforations, said sections each having indicia therein and being provided with respective seams for at least partly closing off the trailing ends thereof to form bags, said method comprising arranging an article to be bagged at a bagging station, displacing the tubing longitudinally to bring the leading end of the foremost section of the sequence over said article and such that the seam in the foremost section tends to seat on said article, sensing the indicia on a section subsequent to said foremost section, operating the braking mechanism in response to the sensing of the latter said indicia, and braking, in response to the sensing of said indicia, the longitudinal displacement of the tubing with a force which has a magnitude which is independent of the speed and force of said displacement and which is applied outside of the foremost section and before the seam in the foremost section has seated on the article and while displacement of the foremost section is continued so that the foremost section is detached from the tubing.



3,987,604

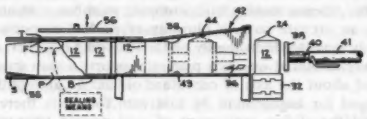
APPARATUS FOR PACKING GABLE TOP CONTAINERS

Perry W. MaGill, Moraga, Calif., assignor to American Potato Company, San Francisco, Calif.

Continuation of Ser. No. 531,380, Dec. 10, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 663,680

Int. Cl.² B65B *63/00*

U.S. Cl. 53—113 **2 Claims**



1. Apparatus for cartoning a plurality of gable top containers of the type that include substantially congruent rectangular side panels having a vertical panel height and a gable top structure including two relatively stiff gable panels integral with and extending upward from the top edges of the side panels, said gable panels having upper edges sealably joined to define an upstanding rib at a gable height above the top edges of the side panels, said apparatus comprising upper and lower vertically spaced apart planar surfaces defining a tunnel having an inlet and an outlet spaced along a straight line path from the inlet, said planar surfaces being transversely parallel and longitudinally convergent from said inlet to said outlet, the space between said surfaces at the inlet being equal to at least the sum of the panel height and the gable height and converging continuously in a substantially linear configuration to the outlet, the space between said surfaces at the outlet approximating the side panel height, said tunnel having a length between the inlet and outlet of at least about the horizontal dimension of said side panels, means for transporting the containers through said tunnel along the straight line path from said inlet to and beyond said outlet, said transporting means acting to transport the containers in a straight line direction such that said rib is transverse to the direction of transport and is subjected to a uniform force throughout its length, means in receiving relation to said outlet for conveying said containers to a station exterior of said tunnel, means for consolidating a plurality of said containers at said station into a rectangular group with the second panels of all said containers facing the same direction, means supporting an elongate carton blank, and means for wrapping said carton blank around the consolidated containers.

3,987,605

ROTARY ARTICLE TRANSFER APPARATUS

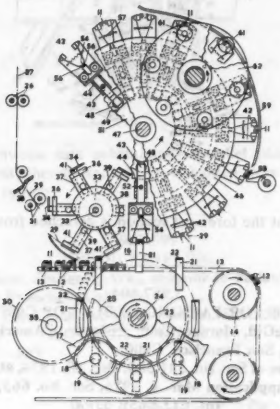
Reginald Frank Johnson, Gainsborough, England, assignor to Baker Perkins Holdings Limited, Peterborough, England

Filed June 11, 1975, Ser. No. 585,887

Claims priority, application United Kingdom, June 12, 1974, 25991/74

Int. Cl.² B65B *11/34*

U.S. Cl. 53—234 6 Claims



1. Apparatus of the kind described comprising a wrapping member, means moving said wrapping member continuously along an arcuate path, a plurality of pocket supports each slidably mounted individually on the wrapping member, a cam follower mounted on each pocket support, a cam track arranged about the axis of curvature of said arcuate path and arranged for engagement by said cam followers thereby to control the sliding movement of said pocket supports, an article-receiving pocket mounted on each pocket support, a continuously rotatable closing member mounted for movement about an axis radially spaced from the axis of the arcuate path of said wrapping member and provided with a plurality of closing units disposed at equal circumferential distances around a pitch circle concentric with the axis of rotation of said closing member and cutting the arcuate path of movement of said wrapping member, the number of said closing units being substantially less than the number of pockets of the wrapping member, means for driving the wrapping member and the closing member at such relative speeds that, as each pocket of the wrapping member approaches a final wrapper-closing station, a closing unit moves towards a position of alignment with that pocket, said cam track being so shaped as to cause the pocket for the time being approaching said closing station to move into alignment with that closing unit and remain in such alignment during operation of said closing unit.

3,987,606

GRASS CLIPPING COLLECTION APPARATUS

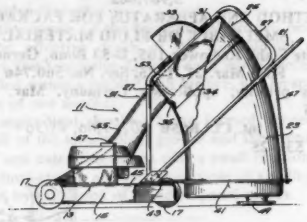
Lee D. Evans, Elm Grove, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jan. 10, 1974, Ser. No. 432,286

Int. Cl.² A01D *35/26*

U.S. Cl. 56—13.4 8 Claims

1. A rotary lawn mower including a blade housing including a discharge outlet, a cylindrical housing having an upper end and a lower end, means supporting said cylindrical housing relative to said blade housing with the axis of said cylindrical housing extending generally vertically, a cover closing said upper end of said cylindrical housing and including therein an exiting air opening communicating with the atmosphere, a grass clipping passage communicating with and extending tangentially from said cylindrical housing and communicating with said discharge outlet for delivering clippings to said cylindrical housing from said blade housing for initial swirling movement in said cylindrical housing and for separation of the



clippings from the air, a receptacle connected to said lower end of said cylindrical housing for receiving clippings therefrom, and a rotary cutter blade in said blade housing for grass cutting and for delivering a stream of air and grass clippings through said discharge outlet and into said grass clipping passage.

3,987,607

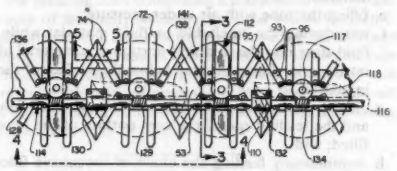
POWER CUTTING MEANS

Ted E. Bone, P.O. Box 44, Pineville, Mo. 64856

Filed Feb. 20, 1975, Ser. No. 551,352

Int. Cl.² A01D *35/00*

U.S. Cl. 56—16.2 6 Claims



1. A power cutting means adapted to be connected to a tractor structure having a power take-off shaft and a hitch assembly, comprising:

a. a support and connector means connected to the hitch assembly of the tractor structure;

b. a cutter means connected to said support and connector means;

c. a power drive means operably connected to said cutter means and to the power take-off shaft to receive power therefrom;

d. said cutter means including a basic support assembly connected to said support and connector means, a cutter assembly mounted on said basic support assembly, and a housing assembly connected to said basic support assembly;

e. said cutter assembly including a blade assembly having a plurality of adjacent blade members rotating about respective vertical axes;

f. said housing assembly having guard means secured to said basic support assembly about said blade members in an adjacent relationship,

g. said blade members of a rectangular shape in transverse cross section; and

h. said guard means including a plurality of first and second guard and divider members, each of a generally U-shape having a slot between upper and lower walls to receive respective one's of said blade members therein so that adjacent edges of said blade members and said guard means cooperate to form a cutting action.

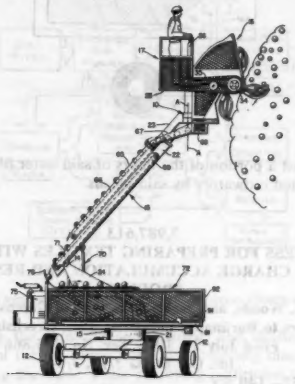
whereby when rotating, the blade members and said guard means cooperate to achieve a cutting action on crops directed between said guard means.

3,987,608

FRUIT PICKING APPARATUS

Dana V. Wilcox, Jr., 13008 Amesbury St., Woodbridge, Va. 22191

Filed Sept. 25, 1974, Ser. No. 509,117
Int. Cl.² A01D *46/20*
U.S. Cl. 56—328 R **10 Claims**



1. Apparatus for picking fruit comprising a carriage adapted to be moved along the ground adjacent a tree to be picked, a support structure mounted on said carriage for turning about a generally vertical axis, a boom assembly, means pivotally mounting the lower end of said boom assembly on said support structure for swinging the boom assembly about a transverse axis, a frame movably mounted on said support structure, a fruit collecting receptacle mounted on said frame adjacent the base of said boom assembly, a picker head comprising a rotor rotatable about an axis transversely of the boom assembly and having a plurality of fruit picking fingers extending therefrom laterally swingably mounted on the upper end of the boom assembly, said boom assembly carrying a fruit conveyor system having its upper end adjacent the picker head and having its lower end positioned adjacent said receptacle, means extending between the picker head and said conveyor assembly for conveying picked fruit from the picker head to the upper end of said conveyor assembly during picking, means on said frame for continually directing fruit from said conveying means into said receptacle, an operator control platform on the upper end of said boom assembly adjacent said picker head, said platform being so located as to enable the operator to look down on the rotating picking fingers during fruit picking, and means for elevating and tipping said frame relative to said support structure for unloading said receptacle.

3,987,609

GARDEN TOOL

Jerry L. Perry, Pacific Grove, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

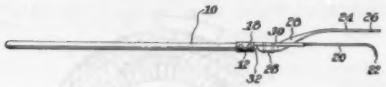
Substitute for Ser. No. 430,655, Jan. 4, 1974, abandoned. This application Mar. 31, 1976, Ser. No. 672,113
Int. Cl.² A01D *7/10*
U.S. Cl. 56—400.05 **2 Claims**

1. A garden tool comprising:

an elongated handle;

a generally flat section coplanar with the handle and defining a circular sector, the center of the circle of which the sector is a part being disposed at one end of the sector, said one sector end being secured to one end of the handle, the sector extending outward from the handle and having a curved outer periphery, said sector having an opening disposed intermediate the handle and said curved periphery;

a plurality of flat spring tines essentially coplanar with the section, said tines being each secured at one end to the curved periphery and extending radially outward, said



tines having teeth at the other ends which extend outward from the same side of all tines at right angles thereto, said tines, section and handle defining a rake; and

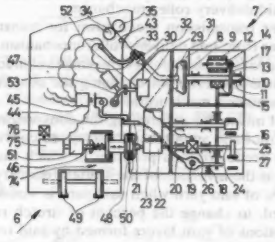
an elongated weeder blade extending in the direction of the handle parallel to the plane of the sector and disposed remote from the same side of the tines out of which the teeth extend, one end of the blade being adjacent said tips, the other end of the blade forming a bent shoulder which extends through said sector opening and is then secured to said sector.

3,987,610

METHOD AND APPARATUS FOR START-SPINNING A THREAD ON AN OPEN-END SPINNING UNIT OF AN OPEN-END SPINNING MACHINE

Fritz Stahlecker, Josef-Neidhart-Strasse 18, D-7341 Bad Ueberkingen, and Hans Stahlecker, Haldenstrasse 20, D-7334 Suessen, both of Germany

Filed Nov. 29, 1974, Ser. No. 528,471
Claims priority, application Germany, Dec. 4, 1973, 2360296; Aug. 6, 1974, 2437762
Int. Cl.² D01H *1/12, 1/34, 15/00*
U.S. Cl. 57—34 R **23 Claims**



2. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in one of drive means and control means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, wherein a common mechanical drive means is provided for rotatably driving spinning rotors of a plurality of said spinning units, and wherein said means which intervene include means for interrupting the rotatable drive of one of said spinning rotors without interrupting the rotatable drive of the other of said commonly driven spinning rotors.

3,987,611

METHOD AND APPARATUS FOR TAKING UP A YARN ONTO A PIRN AFTER FALSE-TWISTING

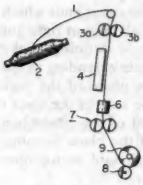
Shigeo Kitamura; Akira Kageyama, both of Osaki; Toshihiro Kajiura, Takatsuki, and Yoshihisa Kubo, Osaka, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan

Division of Ser. No. 252,278, May 11, 1972, abandoned. This application Sept. 12, 1974, Ser. No. 505,231

Claims priority, application Japan, May 14, 1971, 46-32797

Int. Cl.² D02G 1/02

U.S. Cl. 57—34 HS 12 Claims



1. Apparatus for taking up a textured false twist, heat set yarn onto a bobbin after false twisting by a false twisting apparatus provided with a feed roller mechanism and a delivery roller mechanism disposed along a yarn passage at a downstream position thereof and a heater and a false twisting spindle disposed along said yarn passage between said feed roller mechanism and said delivery roller mechanism, comprising

said taking up apparatus disposed at a position downstream of said delivery roller mechanism,

a power transmission mechanism for transmitting driving power from said delivery roller mechanism to said taking-up apparatus, said power transmission mechanism having a speed converter for changing the output of said power transmission mechanism,

control means for controlling the conversion ratio between an input and an output of said speed converter according to a predetermined program in which the program pattern is the inversion of the stretch recovery characteristic curve of said yarn when said yarn is wound at a constant speed, to change the percent of stretch recovery due to locations of yarn layers formed by said textured yarn on said bobbin.

3,987,612

METHOD AND APPARATUS FOR MANUFACTURE OF COMPOSITE YARN PRODUCTS

Emilian Bobkowicz, 400 Kensington, Westmont, Quebec, Canada

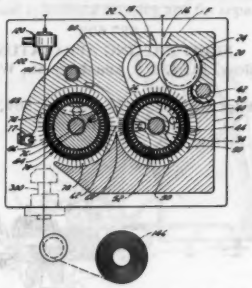
Filed Sept. 18, 1974, Ser. No. 507,054

Claims priority, application United Kingdom, Sept. 19, 1973, 43875/73

Int. Cl.² D02G 1/16, 3/24

U.S. Cl. 57—34 HS 41 Claims

10. In a twister for twisting composite yarn products formed of at least an inner layer of yarn forming material and an outer layer of a fibrous material, and wherein the composite yarn product is rotated, the improvement wherein said twister includes means through which said yarn product passes such



that at least a portion of the fibers of said outer fibrous layer are attracted outwardly by said means.

3,987,613

PROCESS FOR PREPARING TEXTILES WITHOUT STATIC CHARGE ACCUMULATION AND RESULTING PRODUCT

Herbert J. Woods, and Jack Leach, both of Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed July 29, 1965, Ser. No. 475,866

Int. Cl.² D02G 3/12, 3/04

U.S. Cl. 57—140 BY 20 Claims

1. An antistatic textile comprising a substantially uniformly distributed blend of electrically conductive yarn-forming metallic fiber or fibers having a diameter of less than approximately 0.001 inches and a length of under approximately 2 inches, and electrically non-conductive fibers, said conductive to nonconductive fibers being present in a weight ratio of about 1% or below.

3,987,614

VOLUMINOUS FILAMENT YARN

Jutta Cardinal, Hofheim, Taunus; Karl Heinrich, and Günther Bauer, both of Bobingen, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 378,018, July 10, 1973, Pat. No. 3,857,233. This application Aug. 6, 1974, Ser. No. 495,192

Claims priority, application Germany, Feb. 19, 1973, 2308031

The portion of the term of this patent subsequent to Dec. 24, 1991, has been disclaimed.

Int. Cl.² D02G 3/04, 3/34

U.S. Cl. 57—140 BY 5 Claims

1. A voluminous filament yarn of three-dimensional curled filaments without loops, coils and whorls having a positive value of residual crimp c_3, with several loose filament ends sticking out and at least said ends having a flex abrasion resistance of less than about 1500 cycles.

3,987,615

PROCESS OF FORMING YARNS FROM GIN MOTES

Alton V. Hill, Jr., Charlotte, N.C., assignor to Hal Franklin Whisnant, Charlotte, N.C., a part interest

Filed Aug. 18, 1975, Ser. No. 605,261

Int. Cl.² D02G 3/00

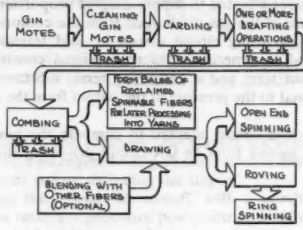
U.S. Cl. 57—156 4 Claims

1. A method of reclaiming from relatively inexpensive gin motes the usable but normally waste cotton fibers contained therein and spinning a reduced cost yarn therefrom, said method comprising

providing a supply of gin motes containing about 35% to 50% of trash with cotton fibers of a high coefficient of variation in fiber length unsuitable for being spun into yarns,

directing the gin motes through a cleaning line and removing a substantial portion of the trash contained therein,

processing the thus cleaned gin motes through at least one carding operation to provide a coefficient of variation in fiber length of about 45% to about 60% and thereafter through at least one drafting operation while removing



further amounts of trash from the cotton fibers of the gin motes,

advancing the thus cleaned, carded, and drafted cotton fibers of the gin motes through a combing machine and combing the same while removing additional trash and short non-spinnable fibers as comber noil and while reducing the coefficient of variation in fiber length to about 30% to 32% level suitable for subsequent processing into yarns, and thereafter spinning the thus reclaimed fibers to form a twisted yarn.

3,987,616

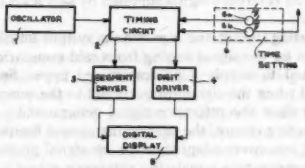
DIGITAL WATCH TIME SETTING SYSTEM

Guy Castegnier, 440 Abelard app. N, Ile des Soeurs, Quebec, Canada

Filed June 5, 1975, Ser. No. 584,169

Int. Cl.² G04B *27/08;* **G04C** *3/00*

U.S. Cl. 58—23 C **5 Claims**



1. In digital watches including a timing circuit driven by a crystal controlled oscillator, said timing circuit providing drive signals for powering a digital time display, the improvement comprising photo-responsive means supplying, when actuated, a voltage signal to said timing circuit to modify said drive signals and thereby to selectively vary the time set on said digital display; and a plate is mounted on the casing of the watch, said plate being provided with an opening to allow light rays to impinge upon one of said photo-responsive means through a corresponding window provided in the watch casing, whenever said window and said opening are in registration.

3,987,617

DISPLAY DEVICE FOR A COUNTING MECHANISM, SUCH AS A CLOCK OR WATCH

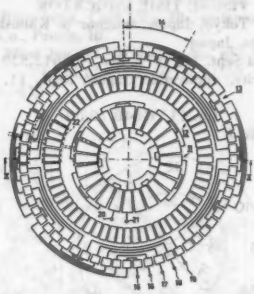
Arie Slob, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 10, 1975, Ser. No. 566,774

Claims priority, application Netherlands, Apr. 29, 1974, 7405724

Int. Cl.² G04B *19/30, 19/34*

U.S. Cl. 58—50 R **6 Claims**



1. A display device of the dial plate type comprising a first system of electrodes and a second system of electrodes, a display medium between said first and second systems of electrodes, said first system of electrodes comprising at least two concentric rings of electrodes, each ring for displaying one quantity and comprising one electrode for each counting position to be displayed, said second system of electrodes comprising one ring of electrodes of which each electrode is in operative arrangement with all rings of the first system, the electrodes of each ring of said first system being divided into groups of adjacent electrodes having the same number per group, each electrode of a group being interconnected to one electrode of each other group belonging to the same ring, all electrodes of one group being in operative arrangement with only one electrode of the second system.

3,987,618

HAND SETTING DEVICE FOR SMALL SWITCHES

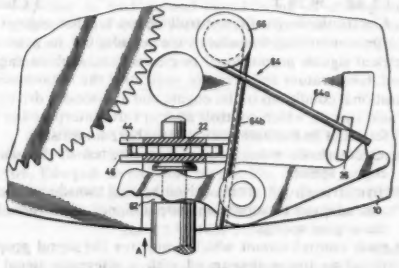
Manfred Hans Barth, Calmbach, Germany, assignor to Timex Corporation, Waterbury, Conn.

Filed June 25, 1975, Ser. No. 590,175

Claims priority, application Germany, Sept. 7, 1974, 2442950

Int. Cl.² G04B *27/00, 27/08*

U.S. Cl. 58—85.5 **5 Claims**



1. Hand setting device for watches with an axially and rotary movable hand setting stem which has a recess into which engages a setting lever, said setting lever operating a rocking

bar which is under the influence of a return spring, the rocking bar carries at least one tooth wheel that can engage and disengage with the setting pinion for the hands, wherein the improvement comprises:

means forming a pivot for said setting lever having axial play with respect to said pivot; and spring means having a first portion acting as a return spring for the rocking bar and a second portion which coacts.

3,987,619

VISUAL TIME INDICATOR

Tadashi Otani, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sept. 11, 1975, Ser. No. 612,539

Claims priority, application Japan, Sept. 11, 1974, 49-104669

Int. Cl.² G04B *19/00*

U.S. Cl. 58—126 R **2 Claims**

1. A visual time indicator suitable for incorporation in a watch or other time measuring devices comprising: a dial made of a sheet of plate and concentrically divided into two zones including an inner zone and an outer zone which has a progressive graduation for hours, minutes and seconds; and hour, minute and second hands to indicate said progressive graduation, said second hand having a short arm and a long arm which extend from the center of said dial in opposite directions, said short arm indicating a graduation provided in said inner zone, said graduation starting from a dial down position and being progressively graduated in a counterclockwise direction, whereby said graduation of the inner zone of the dial and the short arm of the second hand constitute a minute timer.

3,987,620

DEVICE FOR CONTROLLING GAS TURBINE ENGINES

Giorgio Giordano, and Giorgio Caire, both of Turin, Italy, assignors to Fiat Termomeccanica e Turbogas S.p.A., Turin, Italy

Continuation-in-part of Ser. No. 461,084, April 15, 1974, abandoned. This application June 3, 1975, Ser. No. 583,484

Claims priority, application Italy, July 31, 1973, 69312/73

Int. Cl.² F02C *9/04*

U.S. Cl. 60—39.28 T **3 Claims**

1. Electronic device for controlling gas turbine engines of the type comprising transducer means adapted to generate electrical signals proportional to parameters, such as engine speed, temperature and pressure, indicating the instantaneous operational conditions of the engine and a processor driven by the said signals, which controls a servo valve interposed in the fuel feed line to the combustion chamber, comprising:

electromagnetic transducer means adapted to detect the engine speed;

tachymetric circuit means driven by said transducer means and adapted to supply an output signal proportional to the engine speed;

a main control circuit which compares the signal proportional to the engine speed with a reference signal set through a speed variator, said circuit being provided with a feedback ring operable from the outside and supplying a signal which controls the servo valve in the fuel feed line to the combustion chamber;

a function generator circuit adapted to limit the energizing level of the servo valve whenever the signal from the main control circuit tends to rise above the limits set by the speed variator;

sensing means adapted to supply a signal proportional to the gas temperature of the output from the turbine blades and at the exhaust from the turbine;

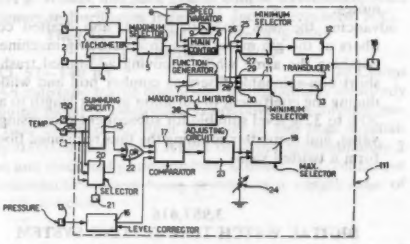
a maximum temperature value selector circuit adapted to supply an output signal proportional to the highest temperature detected by the sensing means in a given time interval;

an average value adding circuit supplying an output signal proportional to the average value of the temperature detected by the sensing means;

a transducer adapted to supply a signal proportional to the pressure of the gas discharged from the compressor;

a level correcting circuit driven by said transducer and adapted to generate a reference signal consisting of a constant term and a correcting term, substantially proportional to the pressure at the output from the compressor;

a comparing circuit adapted to compare the temperature signal issuing from an OR circuit driven by the average



adding circuit and by the maximum temperature selector, with the reference signal supplied by said level correcting circuit;

an adjusting circuit and a maximum output limiting circuit driven by the signal issuing from said comparing circuit, adapted to supply a predetermined upper limit output signal when the signal proportional to the temperature is lower than the reference signal generated by said level correcting circuit, the said adjusting and limiting circuits being moreover adapted when the signal proportional to the temperature equals the reference signal to supply a predetermined lower limit output signal;

maximum value selector means for the temperature signal adapted to select the highest level signal among the signals issuing from the adjusting circuit and an outer predetermined level supplied by a potentiometer;

minimum value selector means adapted to select among the signals issuing from the main control circuit, function generator circuit and maximum temperature value selector circuit, the lowest level signal and adapted to supply a voltage proportional to the latter;

voltage-current converting means driven by said minimum value selector means adapted to electrically drive the servo valve.

3,987,621

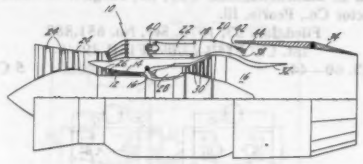
METHOD FOR REDUCING JET EXHAUST TAKEOFF NOISE FROM A TURBOFAN ENGINE

Joseph Sabatella, Jr., South Windsor, and Henry James Kane, Jr., Vernon, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 476,127, June 3, 1974. This application July 18, 1975, Ser. No. 597,268

Int. Cl.² F02K *3/04*

U.S. Cl. 60—204 5 Claims



1. A method for reducing the takeoff jet exhaust noise produced by a jet engine having an outer stream and an unsuppressed inner stream including the step of

operating the engine, at takeoff, with a combination of bypass ratio, gas generator power setting and fan pressure ratio which yields a jet exhaust noise level from the outer stream which is at least 1.0 dB louder than the jet exhaust noise level during takeoff from the unsuppressed inner stream.

3,987,622

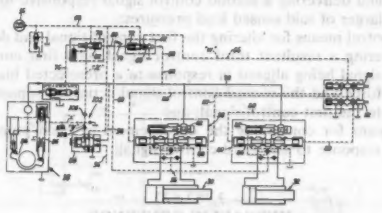
LOAD CONTROLLED FLUID SYSTEM HAVING PARALLEL WORK ELEMENTS

Howard L. Johnson, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 2, 1976, Ser. No. 654,482

Int. Cl.² F15B *18/00*, *13/09*

U.S. Cl. 60—420 13 Claims



1. In a fluid system of a work vehicle having a power source, a pilot pump connected to the power source for delivering pressure signals and at least one fluid circuit having a variable displacement pump connected to the power source, a pump control assembly, and a plurality of different work elements each connected in parallel through a respective control valve to the discharge of the pump, said control valves each being movable between substantially closed and open positions in response to a pilot pressure signal as controlled by a respective work element pilot control valve, the improvement comprising:

first means for sensing the discharge pressure of the pump and delivering a discharge pressure signal in response thereto;

second means associated with the plurality of parallel work elements for sensing the load pressure of each work element and delivering a load pressure signal responsive to the largest of said sensed load pressures; and

a demand margin valve positioned in the pathway of a pilot pressure signal at a location upstream of the work element pilot control valves, said demand margin valve being movable between substantially open and closed positions in response to a biasing force and the load pressure signal as opposed by the discharge pressure signal for controllably altering the magnitude of the pilot pressure signal and delivering a resultant pressure signal W to the plurality of work element pilot control valves.

3,987,623

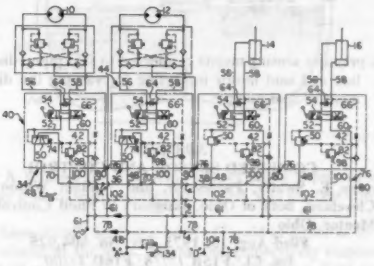
CONTROLLED PRIORITY FLUID SYSTEM OF A CRAWLER TYPE VEHICLE

Donald L. Bianchetta, Coal City, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 23, 1976, Ser. No. 651,888

Int. Cl.² F15B *11/16*, *11/20*

U.S. Cl. 60—422 12 Claims



1. In a fluid system of a work vehicle having a pumping means having at least one pump serving at least two primary work elements and at least one secondary work element, the improvement comprising:

first means for delivering fluid from the pumping means to the first primary work element for the operation thereof;

second means for delivering fluid from the pumping means to the second primary work element for the operation thereof;

a bypass conduit connected to the secondary work element;

third means for sensing the fluid pressure of the first primary work element, delivering a first signal in response to said sensed pressure and selectively passing fluid from the first means into the bypass conduit in response to said first signal being of a magnitude greater than a first preselected value while maintaining said first primary work element free from communication with said first means; and

fourth means for sensing the fluid pressure of the second primary work element, delivering a second signal in response to said sensed pressure, and selectively passing fluid from the second means into the bypass conduit in response to said second signal being of a magnitude greater than a second preselected value while maintaining said second primary work element free from communication with said first means.

3,987,624

HYDRAULIC DRIVE CONTROL SYSTEM

George H. Cooke, and A. Edward Appleby, both of P.O. Box 1909, Edwards Drive, Fort Myers, Fla. 33902

Continuation-in-part of Ser. No. 371,111, June 18, 1973, abandoned. This application June 23, 1975, Ser. No. 589,478

Int. Cl.² F16H *39/46*

U.S. Cl. 60—431 7 Claims

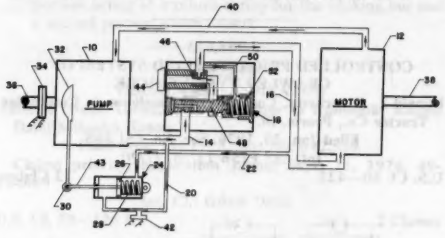
1. A variable input constant RPM output hydraulic drive control system comprising:

a variable hydraulic displacement pump;

a pump discharge means;

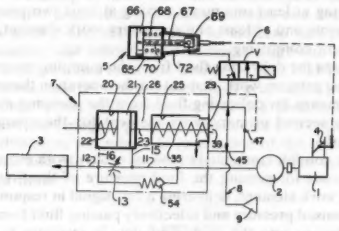
volume control means connected to said discharge means;

a constant displacement hydraulic motor;
volume control input means connecting said volume control means to the input side of said motor;
a motor discharge line connecting said motor and said pump input side; and



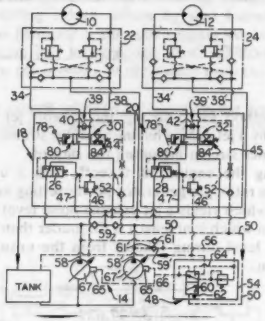
a pressure sensing means connected to said pump discharge line and said motor input line for varying the displacement of said pump.

3,987,625
COMBINED SENSOR AND CONTROL
Eugene E. Swatty, Painesville, and William Wilson Lyth, Cleveland, both of Ohio, assignors to Fluid Controls, Inc., Mentor, Ohio
Filed Aug. 15, 1975, Ser. No. 604,925
Int. Cl.² F15B *15/18;* **F16D** *31/00*
U.S. Cl. 60—431 **11 Claims**



1. In combination, a variable speed engine;
a power input control therefor;
a hydraulic pump driven by the engine;
a hydraulic power mechanism for driving a variable load;
a hydraulic power circuit connecting the pump and mechanism;
a hydraulic flow sensor connected in the hydraulic power circuit and operative to sense variations in the rate of flow of working hydraulic fluid in said circuit;
actuating means controlled by the sensor and operative in response to variations in the sensed rate of flow to actuate said power input control to increase the output to said engine upon a decrease in said sensed rate of flow below a preselected rate and to decrease the input to said engine upon an increase in said rate of flow above said preselected rate;
characterized in that said actuating means includes,
a control fluid circuit which is connectable to an extraneous source of control fluid pressure and which is isolated from said hydraulic power circuit;
a fluid pressure regulator connected to the sensor and to said control circuit and operative in response to changes in said sensed rate of flow to vary the pressure of the fluid delivered by said control circuit in an analogous relation to slight variations in said rate of flow; and
an actuator connected in said control circuit to receive said delivered control pressure fluid, and responsive to variations in pressure of said delivered control pressure fluid, and drivingly connected to said input power control of the engine.

3,987,626
CONTROLS FOR MULTIPLE VARIABLE DISPLACEMENT PUMPS
Donald L. Bianchetta, Coal City, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Jan. 23, 1976, Ser. No. 651,889
Int. Cl.² F15B *13/09;* **F16H** *39/46*
U.S. Cl. 60—445 **5 Claims**

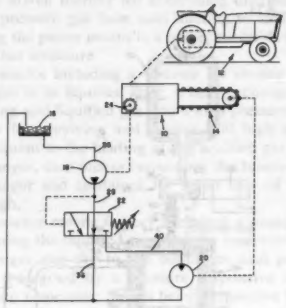


1. Controls for controllably maintaining substantially common discharge rates from at least first and second variable displacement pumps, comprising:
means for sensing the discharge pressure of each pump and delivering a first control signal responsive to the larger of said sensed discharge pressures;
means for sensing the load pressure of each work element and delivering a second control signal responsive to the larger of said sensed load pressures;
control means for altering the first control signal and delivering a resultant third control signal, said first control signal being altered in response to a preselected biasing force and the second control signal acting in opposition to the first control signal; and
means for controlling the displacement of each pump in response to said third control signal.

3,987,627
HYDRAULIC GOVERNOR
Harold Richard Lindstrom, Des Moines, Iowa, assignor to Deere & Company, Moline, Ill.
Filed Nov. 24, 1975, Ser. No. 634,368
Int. Cl.² F16D *31/04;* **F15B** *15/18*
U.S. Cl. 60—459 **6 Claims**

1. In a farm implement, a hydraulic governor apparatus for coordinating the speed of a feeding mechanism hydraulic motor with the processing rate of a processing unit, comprising: a hydraulic fluid reservoir; a fixed displacement hydraulic fluid pump driven by the processing unit in a fixed relationship therewith, and having an inlet conduit means connected with the fluid reservoir and an outlet conduit means connected with the hydraulic motor; a flow responsive valve means for regulating the flow of hydraulic fluid to the motor, interposed in the pump outlet conduit means between the pump and motor, and having an inlet means coupled with the pump outlet conduit means, a first outlet means including conduit means connecting the first outlet means with the fluid reservoir, a second outlet means including conduit means connecting the second outlet means with the hydraulic motor, and a movable valve member responsive to fluid flow through the

inlet means to move in a direction to operatively interconnect the pump outlet conduit means and the hydraulic motor when the flow rate is above a predetermined value; and a biasing



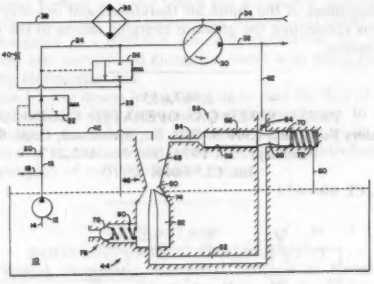
means normally urging said valve member in the opposite direction to operatively interconnect the pump outlet conduit means and the fluid reservoir when the flow rate is below a predetermined value.

3,987,628

CHARGE PUMP AUGMENTING DEVICE

Max Paul Gassman, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Mar. 4, 1976, Ser. No. 663,965
Int. Cl.² F16D *31/00*; F15B *13/09*
U.S. Cl. 60—464 **3 Claims**



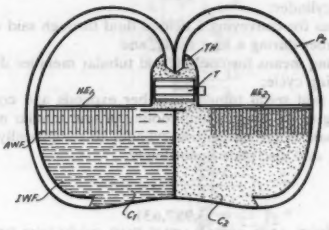
1. In a hydraulic system having a main pump, a fluid reservoir, and a charge pump for supplying fluid from the reservoir to the main pump, a charge pump augmenting device comprising: augmenting means connected to passage means between the charge and main pumps, to the main pump, and to the reservoir responsive to a fluid pressure between the charge and main pumps below a predetermined pressure level and to the operation of the main pump to draw fluid from the reservoir and add the fluid to the passage means between the charge and main pumps.

3,987,629

SYSTEM FOR PRODUCING WORK USING A SMALL TEMPERATURE DIFFERENTIAL

Milan Pecar, Ante Kovacica 1, Zagreb, Yugoslavia

Continuation-in-part of Ser. No. 480,096, June 17, 1974, Pat. No. 3,932,995, which is a continuation-in-part of Ser. No. 241,596, April 6, 1972, abandoned. This application June 17, 1975, Ser. No. 587,704
Int. Cl.² F03G *7/04*
U.S. Cl. 60—516 **14 Claims**



1. A process for producing energy using a pair of zones having a small temperature differential, said process comprising:

a. hermetically sealing a body of liquid in a pair of air-free vessels at the same height and respectively disposed in said zones, one of said vessels including a fluid readily vaporizable at the temperature of the warmer zone but in a liquid state at the temperature of the cooler zone;

b. vaporizing said fluid in said one of said vessels and displacing said liquid upwardly by the pressure of the vaporized fluid through a turbine located above the body of liquid to drive the turbine in one direction and transfer said liquid into the other vessel;

thereafter transferring said warmer zone to said other vessel and the cooler zone to said one vessel to pressurize said liquid with said fluid in said other vessel and displace said liquid through said turbine in the same direction and transfer said liquid into said one of said vessels; and

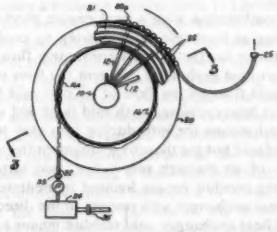
performing work with said turbine.

3,987,630

MECHANICAL THERMAL MOTOR

Leopold A. Hein, Fayetteville, Tenn., and William N. Myers, Huntsville, Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed June 30, 1975, Ser. No. 591,569
Int. Cl.² F03G *7/06*
U.S. Cl. 60—527 **7 Claims**



1. A thermal motor for converting heat energy into mechanical motion comprising:

a. an inner core member supported on a base structure having a solid cylindrical disc plate adjacent a lower portion thereof extending radially therefrom;
b. an inner concentric cylinder carried by said inner core member;
c. an outer concentric cylinder rotatably carried on said disc plate defining a space between said inner and outer concentric cylinders;
d. a spiral tubular member encircling said inner concentric cylinder and contained within said space having a first end portion connected to said inner concentric cylinder and a second end portion connected to said outer concentric cylinder;
e. means for conveying a heated fluid through said tubular member during a heat cycle; and
f. cooling means for cooling said tubular member during a cooling cycle;

whereby said spiral tubular member expands and contracts according to the heating and cooling of said tubular member causing said outer concentric cylinder to reciprocally rotate freely on said disc plate accordingly.

3,987,631

METHOD AND APPARATUS FOR COOLING HEAT ENGINES

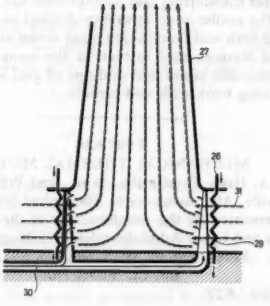
László Heller; László Forgó, and György Frank, all of Budapest, Hungary, assignors to Transelektro Magyar Villamossagi Kulkereskedelmi Vallalat, Budapest, Hungary

Filed Sept. 13, 1974, Ser. No. 505,689

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.[2] F02C *7/12;* **F28F** *13/12*

U.S. Cl. 60—690 **5 Claims**



1. In combination with a heat engine producing a hot gas and having at least one fluid flowing to cool the engine, a cooling tower for the upward convective flow therein of air, an indirect heat exchanger adjacent the base of the tower for cooling said fluid by the flow of air past said heat exchanger in indirect heat exchange with said fluid and up through said tower, and means for introducing into said tower at least a portion of said hot gas thereby to augment the upward convective flow of air through said tower, said introducing means comprising conduit means located immediately downstream of said heat exchanger with respect to the direction of air flow past said heat exchanger, said conduit means extending across the path of said air transversely of the direction of said air flow, said conduit means having a plurality of outlets spaced apart in said transverse direction and facing in said downstream direction.

3,987,632

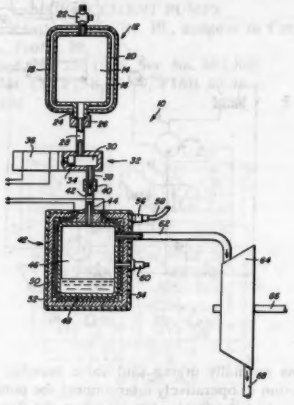
LIQUID AIR ENGINE

Eugene F. Pereda, 11621 Hughes Ave., NE., Albuquerque, N. Mex. 87112

Continuation-in-part of Ser. No. 18,404, Feb. 27, 1970, abandoned. This application July 30, 1971, Ser. No. 167,671

Int. Cl.[2] F01K *25/10*

U.S. Cl. 60—671 **3 Claims**



1. In a power plant having a turbine, insulated storage means containing a supply of liquid air, thermal controlling chamber means connected to the turbine for supply of expanding air in gaseous form to the turbine while the air is undergoing an isothermal change in state, means connected to the storage means for intermittently injecting the liquid air into the chamber means, and heating means in heat transfer relation to the chamber means for thermally regulating said isothermal change in state of the air between liquid and gaseous form without heating the air supplied to the turbine, said injecting means including pressure charging means connected to the storage means for receiving liquid air therefrom, a piston movably mounted in the pressure charging means for displacement of the liquid air therefrom, and one-way valve means connecting the pressure charging means to the chamber means.

3,987,633

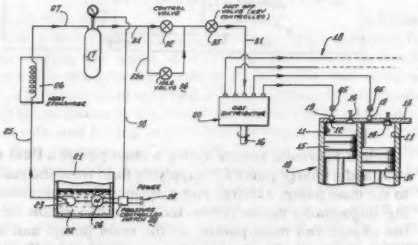
PRESSURIZED GAS OPERATED ENGINE

Sanders Ford, Jr., 1309 S. 58th St., Richmond, Calif. 94804

Filed Apr. 19, 1974, Ser. No. 462,217

Int. Cl.[2] F01K *25/10*

U.S. Cl. 60—671 **1 Claim**



1. In an engine having chamber structure including a head and reciprocating piston means movable in said chamber structure, said structure having associated inlet porting and

valving in the head, and a rotor driven by the engine, the combination comprising:

a. a source of relatively high pressure gas,

b. gas pressure ducting connected with said chamber structure via said porting, and

c. distribution means operatively connected with said rotor to be driven thereby for controlling distribution of said high pressure gas from said ducting to said porting for urging the piston means in a power stroke direction in the chamber structure,

d. said source including a resevoir for storing a supply of said gas in its liquified state, a heat exchanger for transforming said liquified gas into a high pressure gas, a container for receiving and storing said high pressure gas subsequent to the heating of the liquified gas in said heat exchanger, duct means connecting the reservoir, the heat exchanger and container for serial flow of fluid therethrough,

e. said source means further including a pump means for delivering the liquified gas from the reservoir to the heat exchanger and the to the container, said pump means being energized by a pressure responsive means, said pressure responsive means being responsive to the pressure in said container, whereby said pump is energized upon a predetermined drop in gas pressure within said container to deliver liquified gas from the reservoir, to the heat exchanger and then to said container,

f. a duct communication between the container and said distribution controlling means, and a first control valve connected in series with said duct to variably control the flow of said high pressure gas to said distribution means, a second nonvariable valve in parallel flow relationship to said first control valve, said second valve providing a constant flow rate therethrough,

g. said distribution means including a housing having a single inlet, and multiple outlets communicating with said ducting in the form of multiple ducts, a gas distributor rotor axially rotatable in the housing by the engine driven rotor, the gas distributor rotor controlling flow of high pressure gas from said single inlet to said multiple outlets, said outlets formed as slots which are spaced about the rotor and are relatively narrow in the rotary direction of rotor rotation, said outlet slots formed in said housing, the distribution rotor having a single rotating gas distributing outlet formed as a slot which has successive registration with said outlet slots as the rotor rotates, said outlet slots elongated in a direction generally parallel to the rotor axis, said narrow and elongated outlet slots being generally rectangular, and

h. check valve means in said ducting to pass the flow of said high pressure gas from said distribution means to said chamber structure only when the gas pressure in said ducting exceeds predetermined level as controlled by operation of said distribution means.

3,987,634

ROOF-SUPPORTING ARRANGEMENT

Josef Welzel, Wuppertal, Germany, assignor to Hermann Hemscheidt Maschinenfabrik, Bornberg, Germany

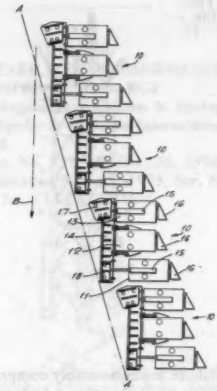
Filed Feb. 13, 1976, Ser. No. 657,938

Claims priority, application Germany, Feb. 18, 1975, 2506779

Int. Cl.² E21D *15/44*

U.S. Cl. 61—45 D **6 Claims**

1. A roof-supporting arrangement for a mine comprising a series of roof-supporting assemblies disposed generally side-by-side along a face being worked but being progressively staggered one behind another, each said assembly comprising a cross beam, three shield-type roof-supporting units, and a pair of rams, a centre one of said three units being directly secured to the cross beam, and the other two (i.e. outer) units being secured to the cross beam via respective ones of said rams so that each outer unit may be aligned with or trail behind its corresponding centre unit depending upon the position of its respective ram, wherein each assembly is arranged (in the normal roof-supporting position of the assemblies) with that one of its outer units which is adjacent a next



3,987,635

METHOD OF REINFORCING ROCK STRATA

John Michael Murphy, Mansfield, England, assignor to Exchem Holdings Limited, London, England

Filed Apr. 1, 1976, Ser. No. 672,624

Claims priority, application United Kingdom, Apr. 1, 1975, 13356/75

Int. Cl.² E21D *21/00, 20/02*

U.S. Cl. 61—45 B **7 Claims**

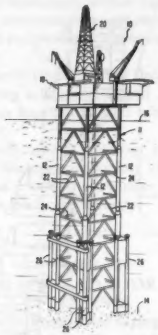
1. A method of reinforcing rock strata, which comprises the steps of (a) drilling a borehole into the rock strata, (b) positioning in the inner end portion of the borehole one or more capsules containing a resinous composition, (c) positioning in the borehole a first wooden reinforcing dowel which is detachably engaged by non-metallic means with a second wooden reinforcing dowel positioned nearer the outer end portion of the borehole, (d) causing the second reinforcing dowel to rotate and thereby consequently causing the first reinforcing dowel to rotate within the borehole whilst in contact with the resin capsule(s) until it has reached the inner end portion of the borehole, (e) discontinuing rotation of the second reinforcing dowel and withdrawing it from the borehole so as to leave the first reinforcing dowel embedded in mixed resinous composition in the inner end portion of the borehole, (f) positioning one or more further resin capsules in the outer end portion of the borehole, and (g) thereafter inserting into the borehole with rotation a wooden reinforcing dowel so as to cause the dowel to become embedded in mixed resinous composition in the outer portion of the borehole.

3,987,636

METHODS AND APPARATUS FOR ANCHORING A SUBMERGED STRUCTURE TO A WATERBED

Stanley J. Hruska, and Albert M. Koehler, both of Houston, Tex., assignors to Brown & Root, Inc., Houston, Tex.

Filed Apr. 30, 1975, Ser. No. 573,024
Int. Cl.² E02B 17/00; E02D 5/30, 5/44
U.S. Cl. 61—100 10 Claims



1. An offshore tower assembly comprising:
frame means located within a body of water and carrying operating facilities;
a plurality of guide jacket means carried by said frame means and being disposed adjacent a submerged earth formation covered by said body of water;
tubular metallic piling elements disposed within and coupled to respective ones of said guide jacket means, with the lower ends thereof projecting into said submerged earth formation;
a metallic reinforcing tube disposed within each of said piling elements, said reinforcing tube being at least one-half the width of its associated piling element, the lower end of said reinforcing tube projecting into a cavity located in said submerged earth formation adjacent the lower end of a respective piling element; said cavity being of a width greater than the width of an associated piling element;
each cavity containing hardened grouting material which defines a grouted footing, said grouting material extending upwardly within said reinforcing tube and between said reinforcing tube and said piling element so that an inner surface of said piling element and inner and outer surfaces of said reinforcing tube are embedded within said grouting material to firmly secure said piling element to said grouted footing; and
each said reinforcing tube projecting downwardly through the interior of said hardened grouting material, substantially to the base of said cavity, and providing internal, tensional, compressional, and torsional reinforcing for said grouted footing.

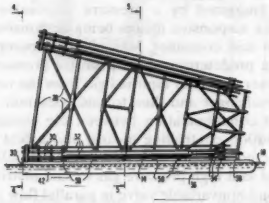
3,987,637

METHOD AND APPARATUS FOR TRANSPORTING AND ERECTING AN OFFSHORE TOWER

Albert M. Koehler, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.

Filed May 6, 1975, Ser. No. 574,964
Int. Cl.² E02B 17/02
U.S. Cl. 61—97 2 Claims

2. A method for transporting and launching an offshore tower jacket with a tower jacket transporting and launching apparatus, said method comprising:
providing a first pair of elongated buoyancy members spaced apart along the entire length thereof and operable to float in a horizontal posture on the surface of a body of water;
providing a second pair of elongated buoyancy members spaced apart along the entire lengths thereof and operable to float in a horizontal posture on the surface of a body of water in a spaced apart relation to said first pair of buoyancy members such that a leg of the offshore tower jacket reposes in vertical alignment with the space between said buoyancy members of each pair along substantially the entire length thereof; providing a plurality of bridging means for maintaining said buoyancy members of each pair in a prescribed, spaced apart relation and for carrying an offshore tower jacket thereon in a horizontal condition, each of said bridging means interconnecting said buoyancy members of a pair in a manner presenting a supportive upper surface to said legs of the tower jacket relative closely adjacent the water line when an offshore tower jacket is being carried so that the off-



shore tower jacket is carried in a posture minimizing the distance between the center of gravity of the jacket and the surface of the body of water relative to that achievable if said buoyancy members of each pair were not spaced apart along the entire lengths thereof;
providing an offshore tower jacket including
jacket legs comprising pile guiding means
a plurality of pile means carried by said pile guiding means;
arranging said outer members, of said first and second pair of elongated buoyancy members to define generally linear, mutually converging, straight outer periphery portions of said apparatus, extending continuously linearly throughout the length of said apparatus; and nesting lowermost ones of said plurality of pile means being nested between and beneath the upper peripheries of said elongated buoyancy members of each of said first and second pair and extending substantially the length of said apparatus.

3,987,638

SUBSEA STRUCTURE AND METHOD FOR INSTALLING THE STRUCTURE AND RECOVERING THE STRUCTURE FROM THE SEA FLOOR

Joseph A. Burkhardt, New Orleans; William D. Loth, Covington, both of La., and Martin O. Pattison, Palos Verdes Estates, Calif., assignors to Exxon Production Research Company, Houston, Tex.

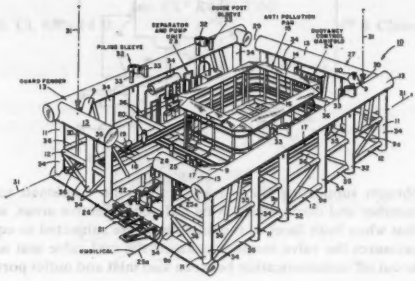
Filed Oct. 9, 1974, Ser. No. 513,429
Int. Cl.² E21B 43/01; B01D 19/00
U.S. Cl. 61—88 24 Claims

1. A subsea structure comprising:
interconnected vertical and horizontal structural tubes to form a box-like framework support for subsea oil and/or gas drilling and production equipment;
certain of said horizontal tubes forming peripheral rings on said framework;
said vertical and horizontal tubes being segregated to form compartmented ballast chambers capable of being flooded and dewatered;

said tubes of said uppermost ring being larger than said other tubes and having at least a part thereof extending outwardly of said other tubes to provide a fender to protect said drilling and production equipment;

at least two of said vertical structural tubes forming pile sleeves;

guide means on said structural tubes for guiding equipment into said pile sleeves for installing piles to anchor said



subsea structure on the sea floor and for releasing said subsea structure from the sea floor;

said tubes providing both floating and submerged stability; and

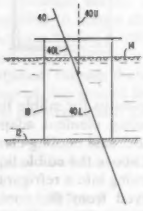
beacons and/or other means of telemetry mounted on said tubular members for communicating with a surface drilling vessel to determine and provide information to the surface concerning tilt of said subsea structure and the azimuth thereof.

3,987,639

METHODS AND APPARATUS FOR INSTALLING A DRILL CONDUCTOR FROM AN OFFSHORE TOWER

Douglas S. Harrison, Horley Surrey, England, and Albert M. Koehler, Houston, Tex., assignors to Brown & Root, Inc., Houston, Tex.

Filed June 26, 1975, Ser. No. 590,403
Int. Cl.[2] E21B *7/04*; L21B *15/02*
U.S. Cl. 61—86 **6 Claims**



1. A method of installing a plurality of conductors into a water bed from a tower situated in a body of water comprising the steps of:

lowering at least one of said conductors from a deck portion of said tower along a straight path inclined relative to vertical until said conductor is embedded in said water bed;

said lowering of said conductor being effected by passing said conductor downwardly through a series of vertically spaced guides, with said guides being operable to permit subsequent bending of an upper portion of said conductor between at least two of said guides;

bending an upper portion of said conductor about a fulcrum to displace an upper segment of said conductor to a vertically straight posture while maintaining a lower segment of said conductor above the water bed in a straight and inclined posture;

said bending of said upper portion of said conductor being effected after said conductor has been embedded in said water bed; and

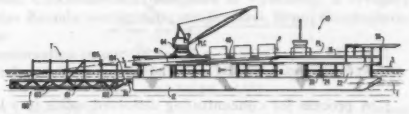
maintaining said lower portion of said conductor substantially unbent and straight.

3,987,640

COLUMN STABILIZED SEMISUBMERSIBLE PIPELAYING BARGE

Yoram Goren, Los Angeles, and Charles N. Springett, Irvine, both of Calif., assignors to Santa Fe International Corporation, Orange, Calif.

Continuation of Ser. No. 537,784, Dec. 30, 1974, Pat. No. 3,924,415. This application Nov. 21, 1975, Ser. No. 634,133
Int. Cl.[2] B63B *35/04*
U.S. Cl. 61—111 **7 Claims**



1. A method of operating a column stabilized semi-submersible pipelaying barge having a pair of elongated hulls disposed in spaced side by side relation,

a working platform spaced above said hulls a predetermined height including a pipe assembly line for joining pipe sections one to the other in end to end relation,

columns connected to and between said hulls and said platform and a crane movable longitudinally along the barge platform comprising steps of:

ballasting the barge to alter its draft between a low draft hull supported floating condition with the hulls having freeboard and a high draft semisubmerged column stabilized floating pipelaying operating condition;

ballasting said barge to preset said barge trim angle PAt between predetermined angular limits;

displacing said crane substantially longitudinally of the barge a distance along said platform such that total crane means load CL and its locus LC in relation to barge trim axis TA at beginning, during and cessation of movement of said crane means causes a resultant moment CLM about the barge trim axis TA of such magnitude whereby typical operation of said crane means over said distance along said platform causes a change in the angle BATC due to movement of said crane whereby BATC will exceed plus or minus about one-half degree from the preset angle of trim of the barge PAT before such movement of said crane if said moment CLM is not counteracted;

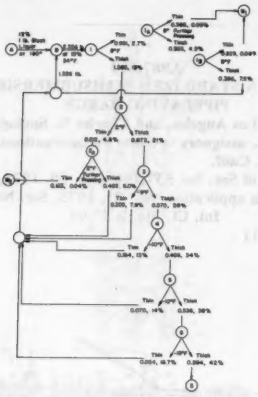
ballasting said barge between beginnig and cessation of movement of said crane said distance along said platform to maintain the barge angle of trim change CMIT less than plus or minus one-half degree variation from said preset barge trim angle PAT;

and ballasting the vessel in semi-submerged condition so that the load line draft of the barge LLD in relation to barge column height BCH is within the limits of envelope curves A and B of FIG. 13 of this application.

3,987,641
FREEZE CONCENTRATION RECOVERY PROCESS FOR WOOD PULPING

Hong H. Lee, Charleston Heights, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,423
Int. Cl.² B01D 9/04
U.S. Cl. 62—541 **11 Claims**



1. A process for concentrating dissolved solids in a liquid solution of black liquor from a pulping digester comprising the steps of:

A. Crystallizing approximately 44 to 56 weight percentage of the total weight of solution of solution solvent from a black liquor solution comprising 10 to 18 weight percentage of solids by the removal of heat therefrom;

B. Separating crystals formed by said crystallizing step from remaining liquid thick phase solution by screening;

C. First pressing said crystals in mass by axially applied pressure to express additional thick phase solution occluded between crystals;

D. Relieving the stress of said first pressing on the mass therefrom;

E. Isothermally mixing said stress relieved mass of pressed crystals to redistribute residual occluded thick phase solution without shearing the crystals;

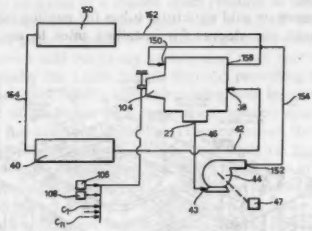
F. Second pressing said crystals in mass by axially applied pressure to express additional thick phase solution occluded between crystals, there being no substantial addition or removal of heat relative to said mass between first and second pressing.

3,987,642
CONTROL VALVE FOR VEHICLE AIR CONDITIONING SYSTEMS

Mauro Portoso, Turin; Aldo Tivoli, Casalgrasso (Cuneo), and Marco Peruglia, Turin, all of Italy, assignors to Fiat Societa per Azioni, Turin, Italy

Filed June 24, 1975, Ser. No. 589,811
Int. Cl.² F25D 29/00; F25B 41/04
U.S. Cl. 62—211 **12 Claims**

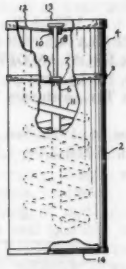
1. In a vehicle air conditioning system comprising a compressor, a condenser and an evaporator which in use of the system is arranged in heat exchange relationship with the vehicle compartment to be air conditioned, a control valve controlling the flow of refrigerant fluid in the said system, comprising a body having an inlet of the compressor, valve means controlling communicaton between the said two ports, first control means arranged to control the valve means in dependence upon at least one external control and second control means for controlling the operation of the valve means in dependence upon the thermodynamic conditions of the refrigerant fluid, said valve means comprise a valve seat located between the two ports, a movable valve member coaxial with and cooperating with the valve seat, and a flexible diaphragm supporting the valve member, the combined valve member and diaphragm having different effective areas, such that when both faces of the diaphragm are subjected to equal pressures the valve member contacts the said valve seat so as to cut off communication between said inlet and outlet ports.



3,987,643
THERMODYNAMIC BEVERAGE COOLING UNIT

Samuel C. Willis, 5419 Hickory Hill Road, Louisville, Ky. 40214

Continuation of Ser. No. 435,305, Jan. 21, 1974, abandoned. This application Jan. 22, 1975, Ser. No. 542,928
Int. Cl.² F25D 3/10
U.S. Cl. 62—371 **5 Claims**



1. In a cooling apparatus for edible liquids, which is of the type including a cooling element adapted to be positioned within the edible liquid, said cooling element having an outlet terminating in a vent above the edible liquid level, and an inlet integral with and opening into a refrigerant container whereby refrigerant is conveyed from the container to the cooling element, flowing through the cooling element and out said vent, the improvement whereby colder liquid temperatures are obtained with less required refrigerant, comprising a refrigerant container adapted to hold refrigerant in its liquid form, release valve means confining the liquid refrigerant in said container when said valve means is in its closed position, flow means admitting said refrigerant to the cooling element in liquid form when said release valve means is open so that vaporization takes place in the cooling element rather than in the refrigerant container, flow control means regulating liquid flow into said cooling element at a rate such that vaporization takes place progressively along the cooling element to maintain a minimum temperature differential between the edible liquid temperature and the vent temperature throughout the cooling cycle as determined by a cooling period of less than 2 and one-half minutes wherein said release valve means is a

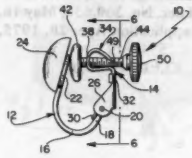
normally closed needle valve capable of being opened from outside the container.

3,987,644

CLIP FOR EARRINGS AND THE LIKE

Nazareno J. Saccoccio, Cranston, R.I., assignor to Aro-Sac Inc., Providence, R.I.

Filed Oct. 28, 1975, Ser. No. 626,580
Int. Cl.² A44C 7/00
U.S. Cl. 63—14 D 6 Claims



1. A clip for earrings and the like comprising, a fixed jaw member having means for contact with the lobe of a person's ear, a movable jaw member pivotally connected to said fixed jaw member at one end thereof, spring means extending between said movable jaw member and said fixed jaw member for urging said movable jaw member towards said fixed jaw member, said movable jaw member terminating in a generally C-shaped loop having base, root and top portions at the other end thereof, said loop having a smooth bore in the root portion thereof for receipt of a screw with an edge portion of said bore in engagement therewith, said screw positioned transversely of said movable jaw member and provided at one end thereof with contact means adapted to cooperate with said contact means on said fixed jaw member for engaging the opposite side of said ear lobe and at the other end thereof with means for manually rotating said screw for transverse movement relative to said movable jaw member for adjusting the spacing between said contact means and accordingly the amount of pressure applied to mount the earring on the ear, the top portion of said loop having a relatively sharp terminal edge projecting toward and in contact with the upper side of said screw between adjacent threads thereof so that said screw is engaged by said loop at two spaced locations thereof, and means on said movable jaw urging said screw upwardly against said terminal edge.

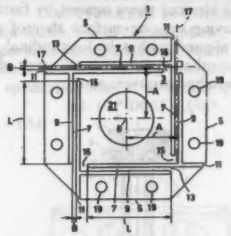
3,987,645

FLEXIBLE SHAFT COUPLING

Marinus Pieter Koster, and Johannes Anthonius Maria Spapens, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 7, 1975, Ser. No. 539,116
Claims priority, application Netherlands, Jan. 23, 1974, 7400886
Int. Cl.² F16D 3/52
U.S. Cl. 64—15 B 5 Claims

1. A flexible shaft coupling comprising an elastically deformable coupling member which can be connected between a driving shaft and a driven shaft for rotation about a coupling axis, wherein the coupling member comprises a rigid plate, two pairs of diametrically opposed elastic elongated tongues, each tongue having a longitudinal axis transverse to said coupling axis and having one end connected to the rigid plate and having another end longitudinally separated from said one end, said other ends of one pair being connected to the driving



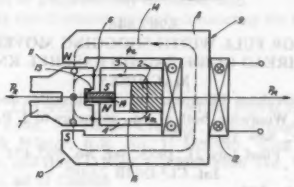
shaft and said other ends of the other pair being connected to the driven shaft.

3,987,646

MAGNETIC ACTUATOR CONSTRUCTION FOR A CIRCULAR KNITTING MACHINE

Jaroslav Knourek; Oldrich Kouril, and Vladimir Mureso, all of Brno, Czechoslovakia, assignors to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi, Brno, Czechoslovakia

Continuation-in-part of Ser. No. 216,342, Jan. 10, 1972, abandoned. This application Nov. 20, 1974, Ser. No. 525,558
Int. Cl.² D04B 15/78
U.S. Cl. 66—50 R 11 Claims



1. In a circular knitting machine having a plurality of knitting elements, each of said elements having at least one ferromagnetic component, the improvement which comprises apparatus for the individual control of any of the knitting elements, the apparatus comprising at least one selector unit which contains a permanent magnet and pole pieces connected therewith, and an electromagnetic unit including an electromagnet and a coil connected therewith, the permanent magnet and its pole pieces, and the electromagnet and its coil being so shaped and arranged with regard to each other and with respect to ferromagnetic component of the knitting elements that they form two substantially separate magnetic circuits whose magnetic fluxes pass parallelly and opposite through a substantial portion of the cross-section of the controlled ferromagnetic component except for the portion associated with the input direction of said magnetic fluxes into said ferromagnetic component wherein said fluxes are substantially perpendicular to each other.

3,987,647

PATTERN DRUM

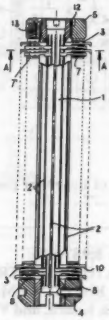
Paolo Orizio, via Gioberti 59, Brescia (BS), Italy

Filed June 30, 1975, Ser. No. 591,398
Claims priority, application Italy, July 2, 1974, 5154/74
Int. Cl.² D04B 15/74
U.S. Cl. 66—50 B 6 Claims

1. Pattern drum for circular knitting and hosiery machines, which comprises:

a. a tubular body having longitudinally superficial grooves therein radially equidistant from one another;

b. a plurality of discs stacked at each terminal of said tubular body and blocked there against by fastening means, each disc having on one surface thereof a number of radial slots aligned with said longitudinal grooves and having on the other surface thereof a pair of circular and concentric notched grooves; and



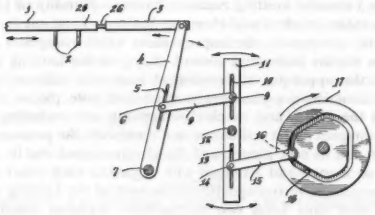
c. a plurality of leaf-like fingers positioned movably within said slots and extending also partially within said longitudinal grooves, said fingers having two terminal projections for defining the limits of displacement and an intermediate, shaped projection to mate with either of said concentric notched grooves.

3,987,648

DRIVE FOR FULL WIDTH SHOGGING MOVEMENT OF THE THREAD GUIDE BAR ON RASCHEL KNITTING MACHINES

Malcolm Graham Fillmore, Jr., Martinsville, and Roy Lee Turner, Woolwine, both of Va., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Filed July 21, 1975, Ser. No. 597,474
Int. Cl.[2] D04B *23/00*
U.S. Cl. 66—207 **2 Claims**



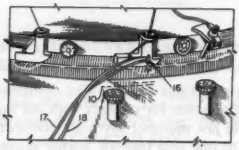
1. In a Raschel warp knitting machine provided with at least one thread guide bar capable of moving in a direction to effect shogging, the improvement which comprises means for driving each of said thread guide bars in directions to effect shogging by a cam and cam follower driven from the main drive of the knitting machine, which means for driving the thread guide bars comprises a first lever and a second lever, the first lever being pivoted at one end, with the other end pivoted to a push rod for the guide bar or bars, said first lever having a centrally located slot with a lockable pivot adjustment which can be moved to various positions in the slot to effect variations of guide bar stroke, a second lever pivoted approximately centrally and being provided with two adjustment slots, one on either side of the central pivot, a link pivoting on the lockable pivot in the slot of the first lever and extending to another lockable pivot in one of the slots of the second lever, and means for driving said second lever comprising a cam, cam follower and a link, said cam being driven in synchronism to the knitting machine drive and said link being pivoted in a lockable pivot movable and lockable in said second slot of said second lever whereby stroke adjustment by moving the lockable and movable pivots in the slots in the first and second levers permits narrow fabrics of adjustable width to be knit, the adjustment in each of the three slots of the first and second levers permitting shogging all the way across each fabric.

3,987,649

DAMAGED NEEDLE DETECTOR WITH SINGLE NEEDLE SENSOR

Edward I. Parker, 34 Oak Ridge Road, Holden, Mass. 01520

Continuation-in-part of Ser. No. 360,636, May 16, 1973, Pat. No. 3,910,074. This application Apr. 28, 1975, Ser. No. 571,949
Int. Cl.[2] D04B *35/18*
U.S. Cl. 66—157 **5 Claims**



1. In combination with a knitting machine having a plurality of needles arranged around the periphery of said machine and adapted to move in a peripheral path about the machine frame during the knitting operation of the machine with means at a predetermined location in said path for projecting said needles to expose the ends thereof as they move in sequence past said location,

a first oscillating circuit having a frequency determining tuned circuit for producing oscillatory energy at the oscillating frequency,

a test coil at said location coupled to said tuned circuit for producing an inductive field at said oscillating frequency through which said needles sequentially move as they are projected at said location individually to pass through said field of said test coil during operation of said machine,

a second oscillating circuit nominally operating at substantially the same frequency as said first oscillating circuit,

a coupling for bidirectional transfer of oscillatory energy between said first and second oscillating circuits, said coupling maintaining said oscillating circuits in frequency step,

means for setting a nominal phase relation between the oscillations of said first and second oscillating circuits which varies between predetermined values as needles of normal configuration pass through said field,

means for producing demodulation signals having a first value corresponding to the difference between said predetermined values and having a second value resulting from the phase change produced by a neelde having an inductance altering abnormal configuration present in said field, and

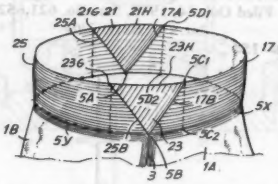
means responsive to said demodulation signals for enabling continuous running of said machine for said first value and for stopping operation of said machine in response to said second value.

3,987,650

METHOD OF FORMING THE WAISTBAND IN PANTY HOSE OR SIMILAR ARTICLE AND THE RESULTING PRODUCT

Ettore Negri, Florence, Italy, assignor to Billi, S.p.A., Florence, Italy

Filed Apr. 4, 1974, Ser. No. 458,027
Claims priority, application Italy, Apr. 5, 1973, 9406/73
Int. Cl.² A41B 9/14
U.S. Cl. 66—177 7 Claims



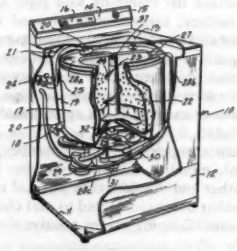
1. A knit construction for the waist portion of one-piece panty hose comprising a pair of tubular welts extending transversely of the direction of knitting and defining a waist opening therebetween, and at least one triangular reinforcing panel between said welts.

3,987,651

COMBINED OSCILLATING AND UNIDIRECTIONAL AGITATOR FOR AUTOMATIC WASHER

Clark I. Platt, Benton Harbor, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Continuation of Ser. No. 418,378, Nov. 23, 1973, abandoned.
This application July 14, 1975, Ser. No. 595,792
Int. Cl.² D06F 13/06
U.S. Cl. 68—133 32 Claims



1. In an automatic washer having a washing receptacle for containing washing liquid and the items to be washed, agitator means within said receptacle for imparting a rollover motion to said items to be washed, and drive means for driving said agitator means, said agitator means comprising:

a lower agitator element driven by the drive means in an oscillatory manner,

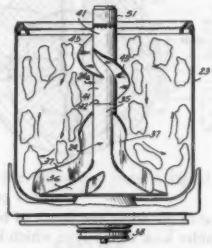
an upper agitator element mounted above the lower agitator element and co-axial therewith, said upper agitator element being positively rotationally driven by the drive means in one direction only, and means associated with the upper agitator element for imparting a downward motion to the items to be washed.

3,987,652

UNIDIRECTIONAL AGITATION ACCESSORY FOR AUTOMATIC WASHER

Ernest Burlin Ruble, South Haven, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Continuation of Ser. No. 418,379, Nov. 23, 1973, abandoned.
This application May 8, 1975, Ser. No. 575,730
Int. Cl.² D06F 13/00
U.S. Cl. 68—134 16 Claims



5. An agitator accessory for a clothes washing machine for washing items, said machine having an oscillating vertical axis agitator with a barrel portion, said accesory comprising:

a sleeve proportioned to be received over and in coaxial alignment with the barrel portion, vane means associated with the sleeve for urging items in the vicinity of said vane means in a downwardly direction, and

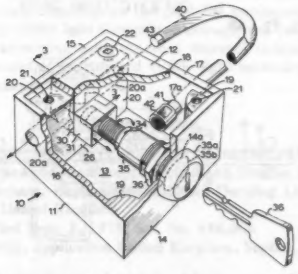
one-way clutch means operably connecting the agitator and the sleeve.

3,987,653

LOOPED CABLE LOCKING DEVICE

Reginald Lyon, 74 Tulane Crescent, Scarborough, Ontario; Kenneth Winter, R.R. No. 1, Kettleby, King Township, Ontario, and Hugh O'Neill, 172 McNicholl Ave., Willowdale, Ontario, all of Canada

Filed Nov. 6, 1975, Ser. No. 629,496
Int. Cl.² E05B 73/00
U.S. Cl. 70—19 8 Claims



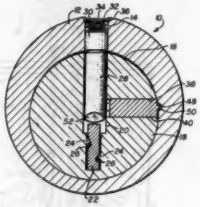
1. A looped cable locking device comprising a casing having a bed, a flexible cable outside the casing but having one end anchored at the casing and having another portion movable longitudinally across the bed, and means for fixing the longitudinal position of said portion of the cable relative to the bed, said means comprising a clamp threadably mounted on a screw and movable towards and away from the bed by rotation of the screw, the screw being rotatable by rotation of a lock supported by the casing, and the casing having a guideway which prevents rotation of the clamp with the screw.

3,987,654

METHOD AND APPARATUS FOR DECODING TWISTING TUMBLER LOCKS AND LOCKS RESISTANT THERETO

George V. Iaccino, and Robert A. Idoni, both of New Rochelle, N.Y., assignors to Lock Technology, Inc., New Rochelle, N.Y.

Filed Oct. 21, 1974, Ser. No. 516,465
Int. Cl.² E05B *18/00, 27/00*
U.S. Cl. 70—364 A 14 Claims



1. A method of decoding the depth of bit cut for a key for a twisting tumbler lock of the type which includes a side bar; a plurality of tumblers each of which includes a chisel shaped bottom, a vertically extending slot for receiving a portion of said side bar and a twist limiting tit at the upper end; and a key plug having a plurality of holes, one for each tumbler in which said tumbler is slidably and rotatably positioned, said holes each having a longitudinally extending slot for receiving the tit on the tumbler associated therewith for limiting the rotation of said tumbler, said method comprising the steps of:

locating a resilient feeler adjacent the bottom of a tumbler adjacent said key plug slot associated with said tumbler;

advancing said feeler into said key plug slot until it engages the tit on said tumbler; and

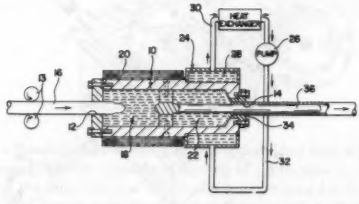
determining the distance said feeler was advanced into said key plug slot.

3,987,655

METHOD OF CONTINUOUSLY TRANSFORMING SOLID NON-FERROUS METAL INTO ELONGATED EXTRUDED SHAPES

Robert J. Myotte, 2250 Par Lane, Apt. PH6, Willoughby Hills, Ohio 44094

Filed Nov. 10, 1975, Ser. No. 630,086
Int. Cl.² B21C *33/00, 29/02*
U.S. Cl. 72—60 10 Claims



1. The method of continuously transforming solid non-ferrous metal into elongated extruded shapes in an enclosed crucible having an entry port and an exit port remote from said entry port comprising the steps of:

a. feeding said solid metal through said entry port into the interior of said crucible;

b. melting said solid metal as it enters said crucible until said crucible is filled;

c. continuing to feed said solid metal into said crucible to apply hydrostatic pressure to said melted metal;

d. continuing to melt said solid metal as it enters said crucible;

e. cooling the portion of said melted metal adjacent said exit port until said melted metal re-solidifies;

f. continuing to cool said re-solidifed metal to extruding temperature;

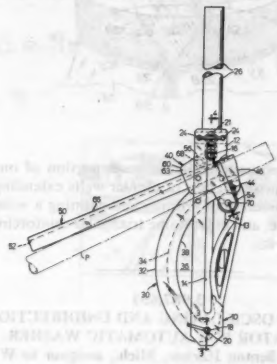
g. continuing to apply hydrostatic pressure to said metal within said crucible by continuing to feed said solid metal through said entry port whereby said re-solidified metal is extruded through said exit port.

3,987,656

PIPE BENDING APPARATUS

Raymond M. Evenson, New Berlin, Wis., assignor to Applied Power Inc., Milwaukee, Wis.

Filed Oct. 14, 1975, Ser. No. 621,652
Int. Cl.² B21D *7/04*
U.S. Cl. 72—154 9 Claims



1. A pipe bending apparatus comprising:

a frame having opposite ends;

a bending shoe having a first arcuate surface for receiving a pipe thereagainst and a second arcuate surface concentric with said first arcuate surface;

means for pivotably connecting said bending shoe to one end of said frame and adjacent an end of said first arcuate surface;

clamping means for clamping said pipe against said first arcuate surface, said clamping means being moveable relative to said frame, said clamping means comprising a pair of spaced apart members for receiving said pipe and said second arcuate surface therebetween, one of said members exerting force against said pipe and the other of said members exerting force against said second arcuate surface; and

motor means comprising a fixed member and a relatively extendable member, said fixed member being connected to said other end of said frame and said relatively extendable member being connected to said clamping means for moving said clamping means relative to said frame.

3,987,657

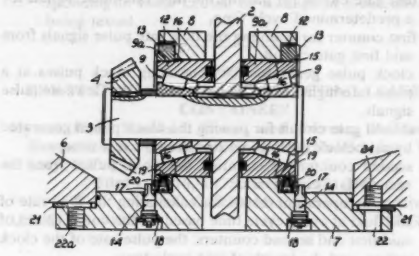
ROLL SETTING DEVICE FOR ROLLING MILLS FOR METAL BARS OR THE LIKE

Giulio Properzi, Via Pietro Cossa, 1, Milan, Italy

Filed June 27, 1975, Ser. No. 591,228
Claims priority, application Italy, July 18, 1974, 25324/74
Int. Cl.² B21B *31/20*
U.S. Cl. 72—247 5 Claims

1. A roll setting device for rolling mills for metal bars or the like, in which at least one of the rolls is arranged on a support structure removably mounted on the rolling mill and in which said roll is supported by support means movable relative to said support structure, said support means comprising a roll supporting shaft and a pair of bearings disposed between the

shaft and said support structure, and said support structure comprising at least one annular element rotatably associated therewith and disposed coaxially to said shaft, said annular element comprising an inner thread for engagement with a thread provided on an outer ring of said bearings and an outer toothing arranged in a plane substantially perpendicular to the



axis of said shaft, the device further comprising at least one control member having one end provided with a pinion for engagement with said toothing and another end accessible from the outside of said support structure, whereby rotation of said control member causes rotation of said annular element and movement of said roll in the direction of the axis of said shaft.

3,987,658

GRAPHITE FORGING DIE

Robert Andrew Herold, Tolland, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 12, 1975, Ser. No. 640,307

Int. Cl.² B21J *13/02*

U.S. Cl. 72—342 **16 Claims**

1. In an apparatus for forging a high strength alloy, which is in a temporary condition of low strength and high ductility, in hot die means at an elevated temperature, the improvement which comprises:

die means comprising graphite having a compressive strength at room temperature of at least 10,000 psi.

3,987,659

APPARATUS FOR TESTING SHOCK ABSORBERS

John D. McKenney, South Laguna, and William H. Conway, Hacienda Heights, both of Calif., assignors to John D. McKenney, South Laguna and William H. Conway, Hacienda Heights, both of, Calif., part interest to each

Continuation-in-part of Ser. No. 377,510, July 9, 1973, Pat. No. 3,877,289. This application Feb. 18, 1975, Ser. No. 550,613

Int. Cl.² G01M *17/04*

U.S. Cl. 73—11 **13 Claims**

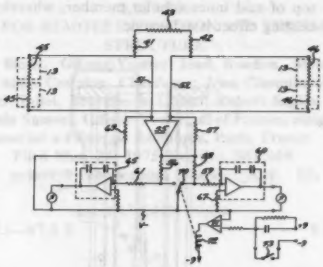
1. In a shock absorber testing device including a ramp adapted to induce sinusoidal excitations to the wheels and the supporting structure therefor of an automobile driven thereover, said ramp further comprising electrical measuring means for producing a first electrical signal indicative of the wheel loading of a first section thereof and a second electrical signal indicative of the wheel loading of a second section thereof, the improvement comprising:

first peak detecting means adapted to receive said first electrical signal for producing a first peak signal indicative of the maximum amplitude thereof;

second peak detecting means adapted to receive said second electrical signal for producing a second peak signal indicative of the maximum amplitude thereof;

comparing means connected to receive said first and second peak signals for producing an output signal indicative of the difference therebetween; and

display means connected to receive the output signal from said comparing means for producing a visual display



indicative of the difference output signal produced by said comparing means.

3,987,660

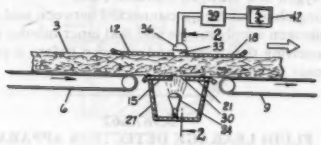
METHOD OF DETERMINING THERMAL CONDUCTIVITY OF FIBER INSULATION

Charles Marcel Pelanne, Littleton, Colo., assignor to Johns-Manville Corporation, Denver, Colo.

Filed Mar. 25, 1974, Ser. No. 454,528

Int. Cl.² G01N *25/00, 21/30*

U.S. Cl. 73—15 A **11 Claims**



1. A process for the determination of the apparent thermal conductivity of a low density matted inorganic fiber body without significant physical distortion or heating of the body, which commprises impinging a beam of visible light on a surface of the body; detecting at a point on the surface of the body substantially opposite to the point of impingment the amount of said visible light transmitted through said body; and thereafter determining said apparent thermal conductivity from said amount of transmitted visible light according to a predetermined correlation.

3,987,661

INSTRUMENT FOR TESTING FLAMMABILITY

Arnold Cornelis Francois Kamp, and Richard Stephen Lewis, both of Mitcham, England, assignors to Oertling Limited, Orpington, United Kingdom

Filed Sept. 3, 1975, Ser. No. 610,006

Claims priority, application United Kingdom, Sept. 6, 1974, 39103/74

Int. Cl.² G01N *25/00*

U.S. Cl. 73—15 R **14 Claims**

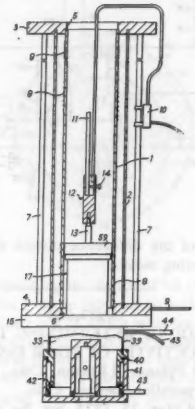
1. An apparatus for testing the flammability of a specimen comprising:

a vertical chimney comprised of inner and outer transparent concentric tubular members arranged one within the other and spaced from each other;

specimen support means positioned within the inner tubular member for supporting said specimen;

electric heating means arranged in the space between said tubular members for graded heating of said inner tubular member, said heating means comprised of:

a helically wound coil wound about the inner tubular member in the space between the inner and outer tubular members, said coiled wire having the spacings between the coil loops decreasing in width toward the top of said inner tubular member, whereby a graded heating effect is achieved;



oxygen and nitrogen supply means operatively connected to the inside of said inner tubular member for supplying oxygen and nitrogen thereinto; and

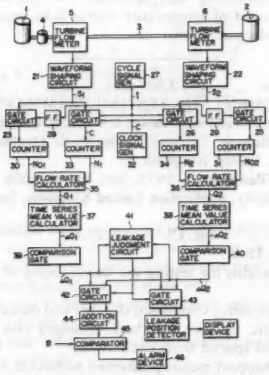
mixing chamber means connected between said oxygen and nitrogen supply means and said inner tubular member for receiving the oxygen and nitrogen before it passes to the inner tubular member.

3,987,662

FLUID LEAKAGE DETECTION APPARATUS

Atsushi Hara, Tokyo; Hideo Hayashi, and Sigeru Ohtomo, both of Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed June 30, 1975, Ser. No. 591,319
Claims priority, application Japan, July 3, 1974, 49-76183
Int. Cl.² G01M *3/28*
U.S. Cl. 73—40.5 R **6 Claims**



1. An apparatus for detecting a flow rate between the upstream and downstream points of a fluid passage having means for detecting pulse signals generated at pulse rates corresponding to the respective flow rates of the fluid at said upstream and downstream points,

characterized in that said apparatus comprises:

a flow meter means at each of said upstream and downstream points for generating flow rate pulse signals at pulse rates corresponding to the respective flow rates to be detected,

a first gate circuit for passing the flow rate pulse signals for a predetermined cycle time,

a first counter for counting the flow rate pulse signals from said first gate circuit,

a clock pulse generator for generating clock pulses at a pulse rate higher than the pulse rate of the flow rate pulse signals,

a second gate circuit for passing the clock pulses generated by said clock pulse generator in said cycle time,

a second counter for counting the clock pulses from the second gate circuit, and

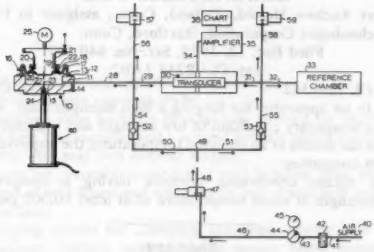
arithmetic operation means for calculating the flow rate of the fluid at every cycle time based on the count values of said first and second counters, the pulse rate of the clock pulses, and the length of said cycle time.

3,987,663

METHOD AND APPARATUS FOR QUICKLY TESTING THE SEALING EFFECTIVENESS OF A RADIAL-LIP SHAFT SEAL

James A. Repella, Madison Heights, Mich., assignor to Federal-Mogul Corporation, Detroit, Mich.

Filed Oct. 29, 1974, Ser. No. 518,607
Int. Cl.² G01M *3/28;* **F16J** *15/32*
U.S. Cl. 73—46 **10 Claims**



3. A device for quickly testing the sealing effectiveness of an unlubricated shaft seal of the type having a radial shaft-engaging lip and a mounting portion, including in combination:

seal support means having a directly accessible structure open to the atmosphere for directly receiving, with a slip-in fit, a seal to be tested at its said mounting portion and for supporting said seal in a leak-tight manner,

a rotatable test shaft having an end facing said seal support means and having its centerline offset from its axis of rotation and having an outer unlubricated periphery of the size for which the seal to be tested is designed, so that the lip of the seal engages said periphery, said shaft having a predetermined runout relative to said axis of rotation and to said seal support means, so that said seal lip is subjected to a predetermined shaft runout,

means for moving said seal support means and test shaft relatively to each other into a retracted position for installation and removal of each said seal over said end and for moving said seal support means and said test shaft relatively to each other into an advanced position for testing said seal,

means for rotating said test shaft at a desired speed,

said seal support means, said test shaft, and the seal to be tested bounding and providing all the elements of a dry test chamber which is completely accessible at all times,

and is completely enclosed except for an air inlet, so that it can be kept free of liquids,

a comparison chamber separate from said test chamber,

means for sending air under a desired pressure to both said chambers simultaneously

transducer means for detecting any development of pressure differences between said chambers, and

indicator means for indicating pressure differences corresponding to those caused by leakage of a defective seal being tested.

3,987,664

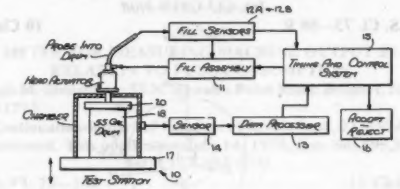
DRY-TESTING SYSTEM FOR DETECTING LEAKS IN CONTAINERS

Hyman Hass, Stamford, Conn., and Terrence P. Murphy, Hempstead, N.Y., assignors to Applied Fluidics, Inc., Westbury, N.Y.

Filed Dec. 16, 1975, Ser. No. 641,296

Int. Cl.² G01M 3/32

U.S. Cl. 73—49.2 **17 Claims**



14. The method of testing containers for leaks comprising the steps of:

A. placing the container within a chamber and hermetically sealing the chamber during a test period;

B. air pressurizing the container within the chamber and maintaining the internal pressure therein substantially constant during the test period to prevent physical distortion of the container;

C. sensing the pressure within the zone between the container and the chamber during the test period to produce a test signal having a waveform whose amplitude changes with time and is a function both of the effect of container temperature on zone pressure and the effect of a pressure transfer from the container to the zone should a leak exist; and

D. processing the test signal to discount the temperature effect on pressure to produce an indication which reflects only the existence of a leak.

3,987,665

NON-DESTRUCTIVE TEST METHOD FOR ASSESSING TEXTILE MATERIAL DEGRADATION

John V. E. Hansen, Westboro, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 22, 1975, Ser. No. 606,820

Int. Cl.² G01N 29/00, 33/36

U.S. Cl. 73—67.2 **10 Claims**

1. A non-destructive test method for detecting degradation of physical properties in textile materials which comprises:

a. placing a fixed length of a test sample of a textile material selected from the group consisting of fibers, yarns and fabrics, under tension,

b. impacting said tensioned textile material to cause it to ring in its free or resonant mode generating acoustic signals,

c. detecting the generated acoustic signals,

d. determining the frequency of the acoustic signals, and

e. comparing said frequency with the frequency obtained under identical conditions of a non-degraded control of the same textile material, with any deviation from the frequency of the control signifying degradation of physical properties in the test material.

3,987,666

DEVICE FOR REMOTE INSPECTION AND TESTING OF A STRUCTURE

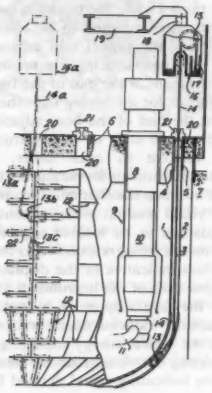
Bernard Blanc, Gif-sur-Yvette; Jean Boudou, Meudon-la-Foret; Alain Castaing, Chevreuse; Jean Clasquin, Antony; Bernard Gallet, Bruyeres le Chatel; Robert Saglio, Massy, and Alain Samoel, Gif-sur-Yvette, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 24, 1975, Ser. No. 561,064

Claims priority, application France, Apr. 10, 1974, 74.12622

Int. Cl.² G01N 29/04

U.S. Cl. 73—67.8 S **9 Claims**



1. A device for remote testing of a structure, comprising a primary vessel surrounded externally by a containment vessel, wherein said device comprises a self-propelled carriage, means for inspecting the primary vessel on said carriage, said carriage moving within the interspace between the primary vessel and the containment vessel to inspect and test any predetermined zone of the primary vessel, a drive mechanism for said carriage co-operating with the oppositely-facing wall of the containment vessel and applied against said wall, a composite cable suspending said carriage and supplying said carriage with power and with different fluids required for positioning and operation of said inspection means, said cable serving to introduce the carriage into the interspace and to withdraw it therefrom, a handling apparatus for actuating said composite cable, said self-propelled carriage comprising a supporting chassis, two parallel driving caterpillar tracks on said chassis, two sprocket-wheels on said chassis guiding and driving said chassis at an adjustable speed, said sprocket-wheels being located respectively at the front and at the rear with respect to the direction of displacement of said carriage, a motor driving each sprocket-wheel in rotation independently of the other sprocket-wheel about an axis located transversely with respect to said chassis, each of said caterpillar tracks including a plurality of identical articulated elements in juxtaposed relation, lateral rollers for said elements engageable with said sprocket-wheels, and means carried by each of said elements for temporary attachment to the surface of the containment vessel for maintaining said carriage applied against said containment vessel without limiting its relatively displacement in front of the primary vessel.

3,987,667

SELF-CONTAINED INSTRUMENT FOR MEASURING SUBTERRANEAN TUNNEL WALL DEFLECTION

Donald Edgar Rasmussen, Kennewick, and Peter John Hof, Jr., Richland, both of Wash., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed June 9, 1975, Ser. No. 585,223
Int. Cl.² G01B 7/16
U.S. Cl. 73—88 E 36 Claims

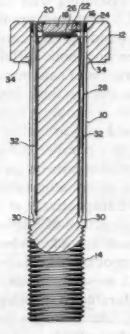
23. Apparatus for measuring the amount of deflection of a subterranean tunnel while the tunnel is being dug comprising a rod-like instrument adapted to be inserted into a radially extending bore of the tunnel wall adjacent the end of the tunnel where the tunnel is being dug, means for anchoring one end of the instrument at the end of the bore remote from the tunnel wall, means for anchoring the other end of the instrument adjacent the end of the bore adjacent the tunnel wall, said first and second ends of said instrument being linearly displaceable relative to each other, transducer means mounted on the instrument for measuring the amount of linear displacement between the first and second ends of the instrument, binary visual readout means mounted on a face of the instrument adapted to be located adjacent the tunnel wall, said readout means being responsive to the transducer means to display values indicative of the displacement between the first and second ends of the instrument, photodetector means mounted on the face responsive to optical energy derived from an externally induced operator command, and means responsive to the optical energy impinging on the photodetector for connecting the visual readout means to be responsive to the position indicating signal derived from the transducer means.

3,987,668

LIGHT REFLECTIVE OPTI-MECHANICAL DISPLACEMENT MICROINDICATOR

Charles H. Popenoe, 6307 Wiscasset Road, Bethesda, Md.

Filed Nov. 17, 1975, Ser. No. 632,838
Int. Cl.² G01L 1/24
U.S. Cl. 73—88 F 13 Claims



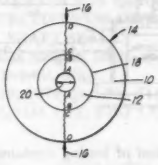
1. A displacement indicator comprising a light transmitting member having two opposite surfaces and a light absorbing member disposed at one surface of said light transmitting member, said one surface of said light transmitting member having a faceted light reflective configuration, said light transmitting member and said light absorbing member being moveable relative to each other between two end positions, in one end position said light reflective surface of said light transmitting member is in intimate contact with the adjacent surface of said light absorbing member whereby incident light passing through said light transmitting member is absorbed by said light absorbing member and in the other end position said members are spaced from each other producing an air gap between said reflective surface and said adjacent surface of said light absorbing member whereby incident light is internally reflected at said reflective surface and passes out of said light transmitting member.

3,987,669

METHOD OF DETERMINING THE RELATIVE FRACTURABILITY OF MATERIALS

Abbas Ali Daneshy, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Mar. 1, 1976, Ser. No. 662,625
Int. Cl.² G01N 3/08
U.S. Cl. 73—88 R 10 Claims



1. A method of determining the relative fracturability of two materials comprising the steps of:

a. forming samples of said materials into complementary shapes;

b. bonding said materials together along adjacent surfaces to form a composite sample thereof;

c. applying a force to said composite sample whereby fractures are created and extended in said materials in directions transverse to said bonded surfaces;

d. sensing the displacement of said sample resulting from the application of said force thereto while said fractures are created and extended in said sample;

e. controlling the rate of application of said force to said sample in proportion to said sensed displacement whereby said displacement increases at a selected rate while said fractures are created and extended in said sample; and

f. observing the variations in said force applied to said sample while said sample is fractured so that the force required to create and extend fractures in said materials and the relative fracturability of said materials and determined.

3,987,670

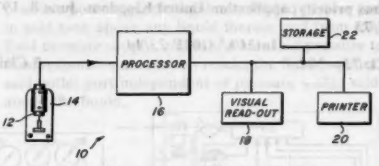
BLADE WEAR MEASURING SYSTEM

James J. Tuzzeo, Columbus, Ohio, and Donald F. Aitken, Jr., Plainville, Conn., assignors to General Electric Company, Columbus, Ohio

Filed May 15, 1975, Ser. No. 577,761
Int. Cl.² G01N 3/56
U.S. Cl. 73—104 4 Claims

1. A system for measuring blade wear comprising: a displacement transducer having a follower, said transducer being adapted and arranged to generate a signal output in response to displacement of the follower; fixture means for mounting said transducer in fixed relative position thereon, said fixture means having fixedly positioned reference means for engaging

said blade on a predetermined location such that said follower contacts the wear surface of the blade; processing means operatively coupled to said transducer means to derive a signal input therefrom and amplify and calibrate said signal



and said processing means also including means for storing reference datum and means for subtracting said reference datum from the data measued by the transducer to provide a net blade wear output signal; and means coupled to said processing means for outputting the net blade wear signal.

3,987,671

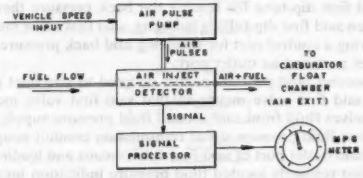
METER FOR MEASURING MACHINE OUTPUT IN RELATION TO FUEL CONSUMPTION

Hugh M. Monaghan, 32 N. Howell's Point Road, Bellport, N.Y. 11713

Continuation-in-part of Ser. No. 508,305, Sept. 23, 1974, abandoned. This application July 14, 1975, Ser. No. 595,923

Int. Cl.[2] G01F *9/00*

U.S. Cl. 73—114 **11 Claims**



10. Method for measuring output in relation to fuel consumption of a machine employing a liquid fuel and having a fuel line interconnecting a fuel supply station with the machine, and receiving fuel from the fuel supply in proportion to machine demand for fuel, comprising:

a. injecting a gas into the fuel line for producing bubbles of the same size in a length of the fuel line for slug flow of the fuel through said length, in dependence on machine output,

b. measuring the volume of bubbles in said length as measure of said output in relation to fuel consumption.

3,987,672

TIRE INSPECTION SYSTEM

Phillip K. Loyer, Waynesville, N.C., assignor to Picker Corporation, Cleveland, Ohio

Filed Aug. 7, 1974, Ser. No. 495,493

Int. Cl.[2] G01M *17/02*

U.S. Cl. 73—146 **29 Claims**

27. An apparatus for inspecting tires, comprising:

a. a support;

b. inspection structure carried on said support and defining an inspection station, including:

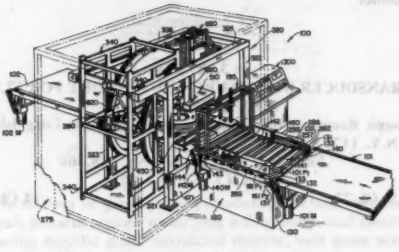
i. at least one pair of spindles;

ii. a pair of crossed arm members pivotally supported on said structure and each carrying a separate one of said spindles;

c. a positioning unit carried on said support and being positioned upstream from said inspection station for sequentially receiving tires to be inspected from a source of tires, for positioning each tire laterally of a feed path, and for feeding positioned tires one at a time along the feed path toward the inspection station;

d. the positioning unit including a pair of arms one of which is positioned on each side of the feed path, the unit also including a reversible drive system interconnecting the arms for relative movement to engage and position a tire interposed between said arms in directions laterally of said feed path;

e. the improvement whereby each of said arms carries a separate sensor assembly, each of which sensor assemblies comprises:



i. a member movably carried by its arm at a position between said arms for engaging such tire when said arms move toward each other, said member being movable relatively to its arm;

ii. biasing means biasing said member toward the other; and

iii. an electrical sensor operably connected to said member and its arm to sense relative movement between said member and its arm for providing an electrical signal variation when said member is moved relative to its arm in response to engagement of said member with such tire.

3,987,673

ULTRASONIC TRANSDUCER DEVICES

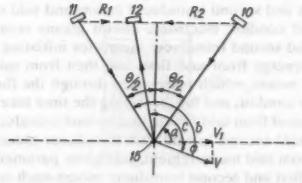
Per Loubaerg Hansen, Gentofte, Denmark, assignor to National Research Development Corporation, London, England

Filed Jan. 3, 1975, Ser. No. 538,325

Claims priority, application United Kingdom, Jan. 3, 1974, 313/74

Int. Cl.[2] G01F *1/66;* **A61B** *5/02*

U.S. Cl. 73—194 A **17 Claims**



1. A Doppler flowmeter for measuring blood flow in a vascular channel, comprising: an assembly of electro-ultrasonic transducers arranged to direct ultrasonic radiation to a zone spaced from the assembly and to receive radiation reflected therefrom, the transducers being spaced apart and capable of providing first and second radiation beam paths from a transmitting transducer to a receiving transducer after reflection from said zone such that the resultants of the beam paths lie in substantially opposite directions, and processing

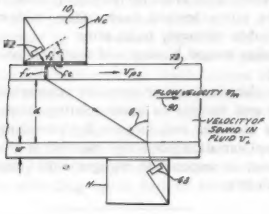
means coupled with the transducer assembly for receiving signals indicative of the reflected radiation having means for monitoring the instantaneous frequency difference between reflections derived from radiation following said first and second paths and for providing an indication proportional to said instantaneous frequency difference, the transducer assembly being operable to project radiation to said zone positioned within the channel such that part of the first path forms an acute angle with the direction of blood flow and part of the second path between the transducer assembly and channel forms an obtuse angle with the direction of blood flow, whereby the radiation frequency is Doppler shifted during reflection to provide frequency difference signals spaced in frequency by a factor related directly to flow velocity in the channel.

3,987,674

TRANSDUCER STRUCTURE AND SUPPORT FOR FLUID MEASURING DEVICE

Joseph Baumoel, 107 Columbia Drive, Jericho, Long Island, N.Y. 11753

Filed Jan. 3, 1975, Ser. No. 538,366
Int. Cl.² G01F 1/66
U.S. Cl. 73—194 A **14 Claims**



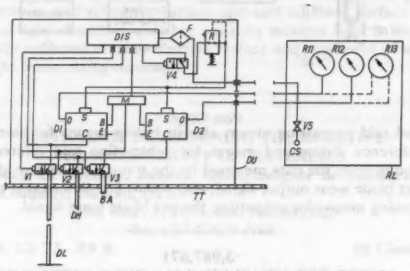
1. Ultrasonic monitoring means for monitoring a given parameter of the fluid within a sealed, elongated hollow conduit; said monitoring means comprising first and second transducer means each secured to the outer surface of said conduit and being longitudinally spaced from one another along the length of said conduit; a coupling fluid disposed between each of said first and second transducer means and said outer surface of said conduit; electronic circuit means connected to said first and second transducer means for initiating pulses of ultrasonic energy from said first, and then from said second transducer means, which pulses pass through the fluid within said hollow conduit, and for measuring the time taken for said pulses to travel from said first to said second transducer means and from said second to said first transducer means, and to indicate, from said measurement, said given parameter of said fluid; said first and second transducer means each comprising first and second respective transducer elements having respective active plane surfaces, and first and second transducer housing means supporting said first and second transducer elements respectively, and coupling ultrasonic energy from said active plane surfaces of said first and second transducer elements to said outer surface of said conduit; the sine of the angle betweeen said plane surfaces of said first and second transducer elements and the axis of said conduit being equal to the ratio between the velocity of sound in said first and second transducer housing means to the shear mode velocity of sound in the wall of said conduit.

3,987,675

PNEUMATIC LEVEL SENSING

Christopher Roland Harrison, Chippenham, England, assignor to Westinghouse Brake & Signal Company Limited, England

Filed May 29, 1974, Ser. No. 474,227
Claims priority, application United Kingdom, June 8, 1973, 27389/73
Int. Cl.² G01F 23/14
U.S. Cl. 73—302 **5 Claims**



1. A pneumatic liquid level sensing apparatus comprising:

a. a first dip-tube depending into a liquid-containing tank whose liquid level is to be sensed;

b. a first fluid pressure supply coupled to said first dip-tube for supplying pressurized fluid thereto and for bubbling fluid into liquid in the tank when a lower end of said first dip-tube is covered by the liquid;

c. a first fluid pressure amplifying valve means coupled to said first dip-tube for sensing the back pressure therein when said first dip-tube is bubbling, said first valve means having a control port for receiving said back pressure, an inlet port and an outlet port;

d. a second fluid pressure supply coupled to said inlet port of said first valve means so that said first valve means receives fluid from said second fluid pressure supply;

e. a first fluid pressure signal transmission conduit coupled to said outlet port of said first valve means and leading to a first remotely located fluid pressure indication means;

f. said first valve means including a fluid pressure responsive member disposed between said control, inlet and outlet ports such as to cause fluid pressure from said outlet port to said first indicator means to be dependent on said back pressure applied to said control port;

g. a second dip-tube having a lower end depending into said tank to a point above peak liquid level;

h. a manifold connected to said first fluid pressure supply and to an upper end of said second dip-tube;

i. said first valve means including a balancing pressure port coupled to said manifold to receive pressure in said tank above any liquid therein and from said first fluid pressure supply, and to transfer said pressure to said fluid responsive member to render the fluid pressure from said outlet port independent of pressure within said tank above the liquid;

j. a third dip-tube depending into said tank to a point below but near peak liquid level, said first pressure supply being coupled to said third dip-tube to supply pressurized fluid thereto and bubble fluid into the liquid in the tank when a lower end of said third dip-tube is covered by the liquid;

k. a second fluid pressure amplifying valve means coupled to said third dip-tube to sense the back pressure therein when said third dip-tube is bubbling, said second valve means having a control port for receiving said back pressure, an inlet port for receiving fluid from said second fluid pressure supply, and an outlet port coupled to a second fluid pressure signal transmission conduit leading to a second remotely located pressure indicator means, said second valve means further including a fluid pressure

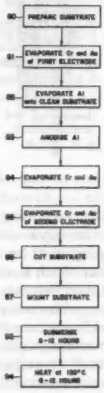
responsive member disposed between said control, inlet and outlet ports such as to cause fluid pressure from said outlet port to said first indicator means to be dependent on said back pressure applied to said control port, and said second valve means further including a balancing pressure port coupled to said manifold to receive pressure in said tank above any liquid therein and from said first fluid pressure supply, and to transfer said pressure to said fluid responsive member to render the fluid pressure from said outlet port independent of pressure within said tank above the liquid.

3,987,676

RELATIVE HUMIDITY DETECTOR

Paul F. Bennewitz, 623 Wyoming Blvd. SE., Albuquerque, N. Mex. 87123

Filed Nov. 28, 1975, Ser. No. 635,574
Int. Cl.² G01N 25/56
U.S. Cl. 73—336.5 23 Claims


90 PREPARE SUBSTRATE
91 EVAPORATE Cr and Au of FIRST ELECTRODE
92 EVAPORATE Al onto CLEAN SUBSTRATE
93 ANODIZE Al
94 EVAPORATE Cr and Au
95 EVAPORATE Cr and Au of SECOND ELECTRODE
96 CUT SUBSTRATE
97 MOUNT SUBSTRATE
98 SUBMERGE 0-12 HOURS
99 HEAT at 120°C 0-12 HOURS

1. A method for making a humidity detector, comprising:
forming successive layers of a first electrical conductor, a hygroscopic material consisting essentially of Al_2O_3, and a second electrical conductor upon a substrate, whereby the electrical impedance between said first and second electrical conductors varies with variations in humidity,
submerging said successive layers into water, and
subsequently exposing said successive layers to a temperature of about 120° C., whereby said impedance variation is made essentially linear for variations in relative humidity between 0% and 100%.

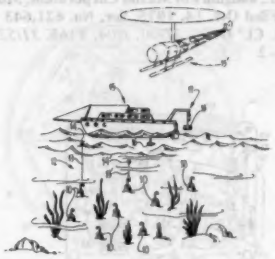
13. A detector for measuring relative humidity comprising:
a header,
a substrate, mounted on said header,
a layer of aluminum on said substrate of thickness of between approximately 10,000 and 20,000 A., a layer of Al_2O_3 of thickness no more than 10,000 A., and no less than 5,000 A. on said layer of aluminum,
a layer of metal formed on said layer of Al_2O_3, said metal layer being selected from the group consisting of gold, platinum, copper and silver, said metal layer being of thickness of about 1,500 A., whereby water molecules from the surrounding air can pass through said metal layer and to said layer of Al_2O_3,
and a pair of electrodes connected directly to said layer of aluminum and said metal layer, respectively,
whereby the impedance of said structure varies linearly with variations in the relative humidity between 0% and 100%.

3,987,677

METHOD AND APPARATUS FOR UNDERGROUND DEPOSIT DETECTION IN WATER COVERED AREAS

H. Ward Alter, Danville, Calif., assignor to Terradex Corporation, Walnut Creek, Calif.

Filed Jan. 30, 1976, Ser. No. 653,991
Int. Cl.² G01N 1/26
U.S. Cl. 73—421.5 R 47 Claims



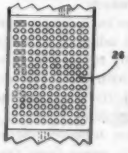
1. A method of geophysical prospecting for underground minerals in earth regions underlying a fluid body, said minerals having specific gases associated thereto, said gases normally migrating to the surface of said earth regions, said method comprising the steps of:
a. Depositing a plurality of open-mouthed gas sample containers at the bottom of said fluid body, each container resting in an inverted position on the surface of the earth region below said fluid body and including means for obtaining a time integrated parameter representative of at least one of said gases;
b. Permitting said containers to remain at said bottom for a predetermined time period to enable said means to obtain said time integrated parameter representative of at least one of said gases migrating into said container over said time period; and
c. Retrieving said containers from said bottom after said predetermined time period has elapsed for subsequent analysis of said parameter.

3,987,678

PNEUMATIC CONDENSER

Jack L. Gable, Bakersfield, Calif., assignor to Superior Cotton Sampling, Inc., Calif.

Filed Feb. 20, 1976, Ser. No. 659,762
Int. Cl.² G01N 1/02
U.S. Cl. 73—422 R 8 Claims



1. In an automatic sampler particularly suited for use in periodically sampling raw cotton as the cotton is delivered to a bale press through a conduit and characterized by an extractor tube connected to said conduit and employed for periodically extracting batches of raw cotton from the conduit, a pneumatic condenser comprising:
extraction means for periodically extracting a batch of raw cotton from a stream of raw cotton passing through the conduit, including a pneumatic catcher communicating

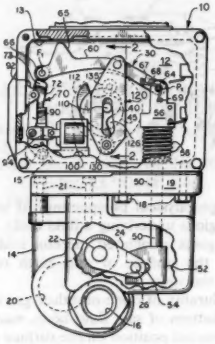
with said extractor tube for serially collecting each extracted batch of raw cotton, and pneumatic means for serially delivering each batch of raw cotton from said catcher to a sample press.

3,987,679

VALVE ACTUATING MECHANISM

James A. Condon, Gaston, and G. Bruce Brenneman, Muncie, both of Ind., assignors to Maxon Corporation, Muncie, Ind.

Filed Oct. 14, 1975, Ser. No. 621,643
Int. Cl.[2] G05G 17/00, 1/04; F16K 31/524
U.S. Cl. 74—2 6 Claims



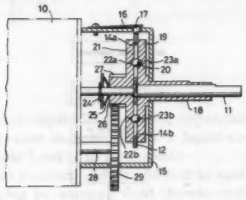
1. A valve actuating mechanism comprising in combination:
valve operating means movable between a first position and a second position,
biasing means urging the valve operating means toward the second position,
lever means operably connected to the valve operating means and movable between a first fulcrum point and a second fulcrum point,
support means to releasably support the lever means at the first fulcrum point,
cam follower means operably connected to the lever means,
first rotatable cam member spaced adjacent to the cam follower means,
second rotatable cam member spaced adjacent to the cam follower means and arranged for rotation with the first cam member,
each of the cam members having a configuration which cooperates with the cam follower means to permit the biasing means to move the valve operating means rapidly toward the second position with the support means releasing the lever means.
the first cam member including a cam periphery defining a first cam segment adapted to engage the cam follower means to releasably retain the valve operating means in the first position with the lever means supported at the first fulcrum point; the first cam member further including on the cam periphery a second cam segment adapted to engage the cam follower means to allow the valve operating means to move from the first position toward the second position with the lever means supported at the first fulcrum point;
the second cam member including a cam periphery having a first cam segment and a second cam segment, the second cam member engages the cam follower means to cause the lever means to move from the first fulcrum point to the second fulcrum point, and causes the valve operating means to move into the second position with the lever means at the second fulcrum point,
whereby the first and second cam members rotate in unison and cooperate with the cam follower means to move the valve operating means from the first position to the second position with substantial mechanical advantage.

3,987,680

UHF TUNER DEVICE

Mitsuaki Naoi, Tokyo; Chozo Kishida, Atsugi, and Kenichi Shiotsuki, Zama, all of Japan, assignors to Mitsumi Electric Co., Ltd., Chofu, Japan

Filed Aug. 26, 1974, Ser. No. 500,656
Claims priority, application Japan, Aug. 27, 1973, 48-95939; Nov. 9, 1973, 48-125433; Dec. 26, 1973, 49-144035; Dec. 26, 1973, 49-144036; Dec. 26, 1973, 49-144037; Dec. 29, 1973, 49-149; Dec. 27, 1973, 49-4218; Dec. 28, 1973, 49-2752[U]; Dec. 28, 1973, 49-2751[U]; Dec. 27, 1973, 49-4718[U]; Dec. 29, 1973, 49-147[U]
Int. Cl.[2] F16H 35/18
U.S. Cl. 74—10.54 14 Claims



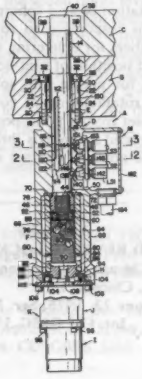
1. A UHF tuner device comprising:
a tuner device proper having a variable capacitor;
a rotatable coarse tuning shaft for channel selection;
a first rotatable member which is rotatable unitarily with the coarse tuning shaft, said first rotatable member having an undulating periphery with concave depressions;
rotational position holding means for holding the first rotatable member in a position to which it has been rotated by the coarse tuning shaft by engaging with any of the concave depressions, said rotational position holding means being organized to allow the rotation of the first rotatable member when the coarse tuning shaft is rotated;
a rotatable fine tuning shaft provided coaxially with the coarse tuning shaft;
a second rotatable member disposed on one side of the first rotatable member and adapted to be rotated unitarily with the fine tuning shaft;
a third rotatable member disposed on the other side of the first rotatable member whereby the first rotatable member is interposed between second and third rotatable members, said first rotatable member having at least one slot, said second rotatable member having at least one first cam groove, said third rotatable member having at least one second cam groove, said second cam groove having a specific angle range smaller than the angle range of the third cam groove;
means for transmitting the rotation of the third rotatable member to the variable capacitor thereby to vary the capacitance thereof; and
at least one engaging member passed through the slot of the first rotatable member and displaceably engaged with respectively the first and second cam grooves of the second and third rotatable members,
said engaging member displacing in the slot, first cam groove and second cam groove in response to the rotation of the second rotatable member with the fine tuning shaft thereby to transmit the rotation of the second rotatable member to the third rotatable member in a reduced rotation angle, meanwhile the first rotatable member is held its stopped position by the rotational position holding means.

3,987,681

CLAMP FOR PRESSES

Harry E. Keithley, Battle Creek, and Loren G. Harrington, Grand Rapids, both of Mich., assignors to Gulf & Western Industrial Products Company, Salem, Ohio

Filed Aug. 9, 1972, Ser. No. 279,056
Int. Cl.² F16H 27/02
U.S. Cl. 74—89.15 9 Claims



1. A clamping device for use on presses comprising, a housing having a bore therethrough, an elongate clamping rod in said bore, said rod being rotatable in opposite directions relative to said bore and axially reciprocable relative thereto, said rod having opposite ends and clamping means on one of said ends, guide means between said housing and rod guiding reciprocation of said rod relative to said bore along a generally linear path between extended and retracted positions relative to said bore and guiding rotation of said rod relative to said bore along a circumferential path at said extended position and between a first circumferential rod position circumferentially coinciding with said linear path and a second circumferential rod position circumferentially spaced from said linear path less than 360°, drive means on the other of said opposite ends of said rod, said drive means including external thread means on said rod and internally threaded sleeve means threadedly engaged with said external thread means, means supporting said sleeve means for rotation relative to said housing and against axial displacement relative to said bore, means for rotating said sleeve means in opposite directions, and means for controlling said means for rotating said sleeve means to achieve, in sequence, linear movement of said clamping rod from said retracted to said extended position of said rod, rotation of said rod in said extended position and in one circumferential direction from said first to said second circumferential rod position, rotation of said rod in said extended position and in the opposite circumferential direction from said second to said first circumferential rod position, said linear movement of said rod from said extended to said retracted position of said rod.

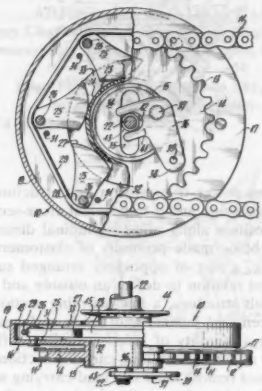
3,987,682

VARIABLE SPEED TRANSMISSION

William J. Roantree, Port Washington, N.Y., assignor to Cyclecentric Corporation, Port Washington, N.Y.

Filed July 11, 1974, Ser. No. 487,655
Int. Cl.² F16H 29/04
U.S. Cl. 74—117 17 Claims

1. A variable speed transmission comprising a rotatable output member having a cylindrical friction surface, a rotatable input member having its axis of rotation movable with respect to the axis of rotation of said output member, and a plurality of pivotally mounted sprags interposed between said input and output members for transmitting rotational motion from said input member to said output member, each of said sprags having an end surface curved on a radius of curvature about a center of curvature which center of curvature is displaced from the pivot point of the sprag for rolling and jamming frictional engagement with said cylindrical friction surface to cause said output member to rotate at a rate equal to the rate of rotation of said input member plus an amount proportional to the extent of relative displacement of said



axes, so that the drive ratio R can be expressed generally as follows:

$$R = 1 + (\epsilon r_s/\delta r_o)$$

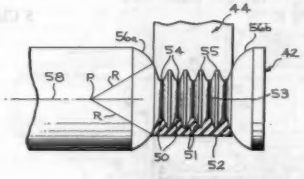
wherein r_o is the radius of said cylindrical output member; r_s is the radius of curvature of the curved end surface of each said sprag; ϵ is the distance between said axes; and δ is the displacement of the center of curvature of each said sprag's curved end surface from the pivot point of such sprag, whereby the drive ratio can be varied by changing the distance between said axes of rotation.

3,987,683

POLY-V-BELT AND PULLEY MECHANISM

Gurdev Singh, Deerfield, Ill., assignor to General Electric Company, Louisville, Ky.

Filed Sept. 3, 1974, Ser. No. 502,621
Int. Cl.² F16H 7/18
U.S. Cl. 74—229 4 Claims



1. In the combination of a rib-and-groove tractive face belt for service as a transmission belt, conveyor belt or the like, wherein the ribs and grooves are parallel to the length of the belt, and a pulley over which the belt is trained, the pulley having (a) a spool with annular grooves and ribs to correspond to and mate with the rib-and-groove tractive surface of the belt, and (b) upwardly and outwardly diverging opposing side walls,

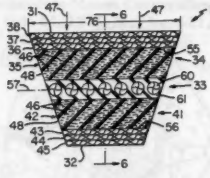
the improvement comprising the said opposing side walls of the pulley each being curved convexly.

3,987,684

ENDLESS POWER TRANSMISSION BELT STRUCTURE

David G. Fisher, and Billy L. Speer, both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio

Filed July 28, 1975, Ser. No. 599,916
Int. Cl.² F16G 5/16, 1/00, 5/00; B29H 7/22
U.S. Cl. 74—233 19 Claims



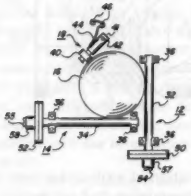
1. An endless power transmission belt structure having a longitudinal dimension and a trapezoidal cross-sectional outline at each position along said longitudinal dimension, said belt structure being made primarily of elastomeric material and comprising, a pair of oppositely arranged surfaces disposed in spaced relation to define an outside and inside surface of said belt structure, a load-carrying section arranged midway between said outside and inside surfaces, a tension section having a plurality of layers including a fiber-loaded layer disposed adjoining said load-carrying section and a fabric layer disposed remote from said load-carrying section, said fabric layer of said tension section having a surface defining said outside surface of said belt, a compression section having a plurality of layers including a fiber-loaded layer disposed adjoining said load-carrying section and a fabric layer disposed remote from said load-carrying section, said fabric layer of said compression section having a surface defining said inside surface of said belt, each of said fiber-loaded layers having a plurality of randomly arranged fibers therein which allow longitudinal flexibility yet provide transverse rigidity for said belt free of shear planes parallel to said load-carrying section, each of said fabric layers having a transverse rigidity which is greater than its longitudinal rigidity, said fabric layers cooperating with said fiber-loaded layers to increase the transverse rigidity of said belt and assure satisfactory operation thereof in associated sheaves.

3,987,685

CURSOR POSITION DEVICE

Willard J. Opocensky, Los Angeles, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 16, 1974, Ser. No. 532,788
Int. Cl.² G05G 9/00
U.S. Cl. 74—471 R 5 Claims



1. Apparatus for indicating movement over a surface comprising:

a housing having an apertured base member,

a sphere loosely supported by said housing such that said sphere can have universal rotation and such that a portion of said sphere extends through said aperture in said base member, contact between said sphere and the surface providing rotation of said sphere indicative of movement of said housing with respect to the surface,

a pair of rotatable members each supported by said housing, each of said rotatable members being adapted to rotate about a longitudinal axis thereof, the axes of rotation of said rotatable members being substantially perpendicular to each other, each of said rotatable members being in frictional abutment with said sphere such that each of said rotatable members rotates as a function of a component of the rotation of said sphere,

transducer means responsive to rotation of each of said rotatable members for delivering signals indicative of the movement and position of said housing, and

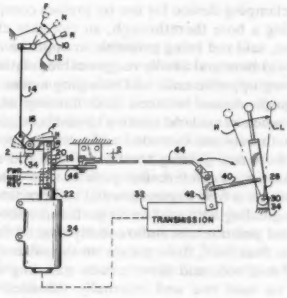
rotatable means for urging said sphere toward said base member, said rotatable means contacting said sphere at a position off-set from a polar position on the surface of said sphere defined by an axis through the center of said sphere and the point of contact of said sphere with the surface.

3,987,686

HIGH SPEED REVERSE LOCKOUT CONTROL

Joseph Paplaski, Chicago, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed June 23, 1975, Ser. No. 589,221
Int. Cl.² G05G 5/08
U.S. Cl. 74—476 4 Claims



1. In a hydrostatic transmission having a control valve including a control valve capable of controlling the direction of hydrostatic transmission output, which may be one of forward, neutral or reverse; and a speed range control arm integral with the hydrostatic transmission for controlling the output speed of the hydrostatic transmission to one of high speed or low speed; a means for preventing simultaneous engagement of the high speed range and the reverse direction of hydrostatic transmission output comprising:

control valve operating means including a control handle, a rod connected at one end to the control handle, a bell-crank connected to the second end of the rod and a control link having an appendage connected to the bell-crank at a first end and to the control valve spool at a second end whereby displacement of the control handle results in longitudinal displacement of the control link and subsequent adjustment of the control valve spool in the control valve;

a speed range lever pivotally mounted to move between a high speed range position and a low speed range position;

a rod connected at a first end to the speed range lever and at a second end to the range control arm whereby movement of the speed range lever results in equivalent movement of the range control arm into one of either the high or low speed range positions;

a control rod having a first end pivotally mounted to the range control arm and a second end;

a lockout plate, having a plurality of apertures, pivotally mounted to a first pivot point in proximity to the control link of the control valve operating means and having the second end of the control rod pivotally mounted through one aperture in the lockout plate allowing the lockout plate to be pivoted into interference proximity with the control link when the speed range lever is moved from the low speed position to the high speed position and the control handle for the control valve is in a forward or neutral position and restricting pivotal movement of the lockout plate into position corresponding to the high speed position of the speed range lever through interference between the lockout plate and the appendage on the control link when the control link and the associated control valve spool is positioned to the reverse position by the control valve operating means.

3,987,687

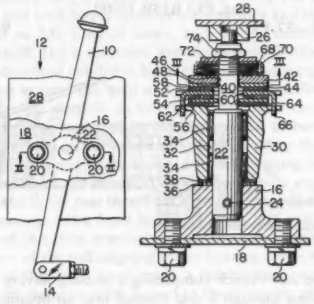
ADJUSTABLE TORQUE FRICTION CLUTCH

James R. Bland, Montgomery, and Fred R. Dauwalder, Aurora, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 407,633, Oct. 18, 1973, abandoned. This application Apr. 30, 1975, Ser. No. 573,219

Int. Cl.² G05G *5/06*

U.S. Cl. 74—531 **1 Claim**



1. A lever mounting apparatus comprising first end member means, a shaft secured relative to the first end member means and extending therefrom, a lever arm having a base portion defining an aperture through which the shaft is disposed, needle bearing means disposed between the base portion and shaft, the lever arm being pivotable about the longitudinal axis of the shaft on said needle bearing means, friction material means disposed between said base portion and first end member means, second end member means defining an aperture through which the shaft is disposed and positioned on the side of the base portion opposite the first end member means, the second end member means being movable along the longitudinal axis of the shaft relative thereto, wherein the second end member means are secured from rotation relative to the shaft about the longitudinal axis of the shaft, friction material means disposed between the base portion and second end member means, means for retaining said second end member means on said shaft, wherein the friction material means disposed between the base portion and second end member means comprise first, second and third friction discs, each mounted on the shaft to be movable along the longitudinal axis of the shaft, and further comprising a first washer mounted on said shaft between the first and second friction discs, and movable along the longitudinal axis of the shaft, and a second washer mounted on said shaft between the second and third friction discs, and movable along the longitudinal axis of the shaft, the first friction disc being in contact with the base portion, the third friction disc being in contact with the second end member means, wherein the second washer is connected with the base portion for rotation therewith about the longitudinal axis of the shaft, and wherein the first washer is secured from rotation relative to the shaft about the longitudinal axis of the shaft.

3,987,688

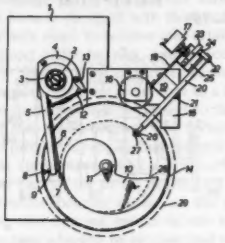
ADJUSTABLE CONTROL CAM

Cecil Sidney Charles Tarbet, Cambridge, England, assignor to Cecil Instruments Manufacturing Limited, Cambridge, England

Filed Feb. 20, 1975, Ser. No. 551,421

Int. Cl.² F16H *53/00, 53/06*

U.S. Cl. 74—568 FS **3 Claims**



1. In a cam mechanism comprising in combination

a. an adjustable cam member having a working surface constituted by the outer periphery of a close-wound helix of spring steel wire, said cam member comprising adjustable carrier members by means of which said helix is mounted on a support member, and

b. a cam follower the improvement according to which said cam follower is a slider having a cam-engaging surface significantly longer in the direction of relative cam movement than the pitch of the turns of the helix.

3,987,689

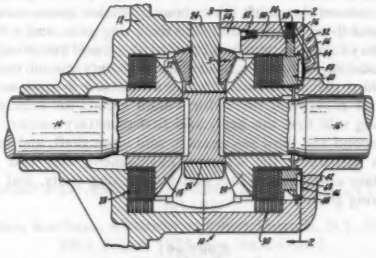
SPEED-SENSITIVE DIFFERENTIAL MECHANISM

James L. Engle, Muncie, Ind., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 23, 1974, Ser. No. 535,595

Int. Cl.² F16H *1/44*

U.S. Cl. 74—711 **7 Claims**



1. A limited slip differential comprising a casing adapted to be rotatably driven, gearing rotatably supported in said casing and adapted for connection with a pair of relatively rotatable output elements, a friction clutch associated with said gearing and said casing and actuable to frictionally resist relative rotation of said output elements, clutch actuator for said friction clutch connected to rotate with one of said output elements and adapted to be moved by fluid pressure, a source

of fluid pressure comprising a fluid pump including pumping members and driving member, one of said members being carried by said casing and the other of said members being integral with said clutch actuator, whereby upon relative rotation between said one output element and said casing said pump will supply pressure which acts on said actuator to actuate said friction clutch.

3,987,690

POWER TRANSMISSION FOR MOTOR VEHICLES

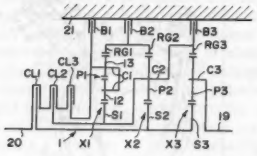
Noboru Murakami, Nagoya; Koichiro Hirozawa, Kariya; Koichi Matsuo, and Kazuo Obara, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 11, 1974, Ser. No. 514,268

Claims priority, application Japan, Oct. 12, 1973, 48-114983

Int. Cl.² F16H *57/10*

U.S. Cl. 74—759 **19 Claims**



1. Power transmission for a motor vehicle comprising an input shaft and an output shaft rotatable about a common axis; a gear mechanism including a first planetary gear set having a first sun gear rotatably supported about said common axis, a first ring gear and first planetary means including inner pinion means meshed with said first sun gear, outer pinion means meshed with said inner pinion means and said first ring gear, and a first planetary carrier supported for rotation about said common axis and rotatably supporting said inner and outer pinion means; a second planetary gear set having a second sun gear rotatably supported about said common axis, a second ring gear having internal teeth and connected to said first ring gear for movement therewith, second planetary pinion means meshed with said second sun gear and said second ring gear, and a second planetary carrier connected to said first sun gear for movement therewith and rotatably supporting said second planetary pinion means; and a third planetary gear set having a third sun gear connected to said second sun gear for movement therewith, a third ring gear having internal teeth and connected to said second planetary carrier for movement therewith, third planetary pinion means meshed with said third sun gear and said third ring gear, and a third planetary carrier rotatably supported about said common axis and rotatably supporting said third planetary pinion means, said third planetary carrier being connected to said output shaft for movement therewith; clutch means for selectively coupling said first sun gear, said first planetary carrier, and said second and third sun gears to said input shaft; and brake means actuatable for selective engagement with said first planetary carrier, said first and second ring gears, and said third ring gear.

3,987,691

EXTENSIBLE NON-CRANKING WRENCH

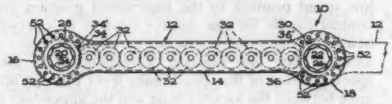
Bobbie O. Savage, 901 Gladeview Drive, Farmington, N. Mex. 87401

Filed Nov. 13, 1975, Ser. No. 631,609

Int. Cl.² B25B *17/00*

U.S. Cl. 81—57.3 **11 Claims**

1. An extensible non-cranking wrench for use in torque nuts or bolts in extremely close quarters where space for cranking is completely lacking and room for a power driver in unavailable, said wrench comprising an elongate body having rotatable sockets at opposite ends thereof, gear teeth formed on the external periphery of each of said sockets, a gear train including one or more idler pinions in driving engagement with the gear teeth of said sockets, adjustable ratchet means for selectively locking said sockets for rotation in one or the other direction, a plurality of perforations arranged around each of



said sockets and means in one of said perforations for locking said wrench to a like wrench at a selected angle to extend into a tortuous or labyrinth path, said sockets being of such size and shape as to include non-circular wall portions to torque nuts and/or bolts, said sockets further being of such shape as to receive and cooperate with coupling means for attachment of sockets, and/or other wrench members thereto.

3,987,692

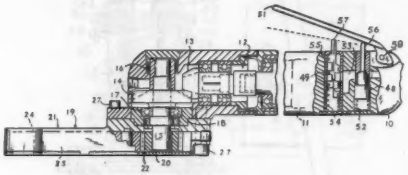
TUBE NUT WRENCH

Richard S. Lesner, Bloomfield Hills, Mich., and Robert D. Roth, Utica, N.Y., assignors to Chicago Pneumatic Tool Company, New York, N.Y.

Filed June 16, 1975, Ser. No. 587,221

Int. Cl.² B25B *17/00*

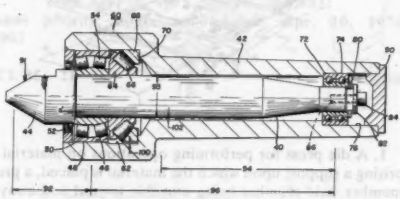
U.S. Cl. 81—57.13 **9 Claims**



1. A tube nut wrench comprising a housing having a radial slot extending through a side thereof into an opening in the area of a forward end of the housing, a rotatable socket member in the opening having a multi-sided socket in its lower end adapted for reception of a tubing nut, a radial slot extending through the periphery of the socket member into the socket and opening axially through opposite ends of the socket member, a gear formed about the periphery of the socket member, a reversible air motor in the housing, a gear train drivingly connecting the motor with the gear of the socket member, manipulative control means for feeding operating air to the motor to effect rotation of the motor and as a consequence of the socket member in a selected direction, and pawl means having cooperation with the gear train for limiting reverse rotation of the socket member to a position in which its radial slot registers with the radial slot of the housing, the radial slots being adapted when in registered relationship to allow a sideways admission of a tube into the radial slot of the socket member (.), wherein the control means comprises a depressible directional flow valve having a spring biased normal position connecting an inlet passage with a reverse side of the motor and having a depressed condition against the bias of the spring connecting the inlet passage with a forward side of the motor, a depressible throttle valve spaced linearly rearwardly of the directional flow valve and having a spring biased normal position blocking an operating air supply passage off from the inlet passage, and a single lever pivoted to the housing in an overhead relationship to both valves, the lever being manipulative to a first position relative to the throttle valve to depress

the latter to a restricted open condition allowing a restricted operating air flow through the inlet passage and the directional flow valve to the reverse side of the motor, and the lever being manipulative to a second position relative to both valves to simultaneously depress the throttle valve to a fully open condition and to depress the directional valve from its normal position to a fully open condition allowing operating air flow from the throttle valve to the inlet passage to pass to the forward side of the motor.

3,987,693
HEAVY-DUTY LIVE CENTERS
Henry F. Swenson, 22 Holmehill Lane, Roseland, N.J.
Filed Dec. 23, 1975, Ser. No. 643,909
Int. Cl.² B23B *23/04*
U.S. Cl. 82—33 R **14 Claims**



1. A heavy-duty live center having a workpiece capacity of 35 tons and with larger appropriate bearings and components as much as 250 tons or more, said center including: (a) a hollow quill; (b) a rotatable spindle carried in this quill, the quill in mounted condition having a work load supporting and extending beyond the quill and with the intermediate portion of the spindle sized so as to provide sufficient clearance between the bore and spindle for the spindle to bow with the application of a heavy load and when bowed by this load the spindle turns freely in the quill; (c) a self-aligning roller bearing mounted on the foreportion of the spindle and adjacent thereto and to the rear thereof is a self-aligning spherical roller thrust bearing; (d) a front bore formed in this quill, the front portion of this bore precisely sized to receive and retain the outer race of the self-aligning roller bearing and with the rear portion of this front bore made a determined amount oversized in its diameter with regard to the diameter of the outer race of the thrust bearing, the rear of this front bore having a face surface normal to the axis of the bore, this face surface providing a stop surface for the rear face of the outer race of the thrust bearing; (e) antifriction bearing means mounted on the rear of the spindle and when mounted in the bore of the quill adapted to receive and support the rear of the spindle; (f) a biasing means in association with the spindle and said bearing means on the rear of the spindle and adapted to provide a preload to the bearings carried in the front bore of the quill; (g) a shoulder provided on the foreportion of the spindle, this shoulder adapted to engage the inner race of the self-aligning bearing and as urged by the applied preload the spindle and this bearing is drawn rearwardly and as this bearing is moved rearwardly its inner race moves the inner race of the self-aligning spherical roller thrust bearing rearwardly to cause the outer race of said thrust bearing to be brought into sliding engagement with the inner rear face surface of the front bore, and (h) sealing means in association with the spindle and front bore of the quill to close the front bore to dirt, coolant and the like to retain the grease in the bearings without contamination and when a heavy load is placed on the extending end of the spindle, the spindle is bowed in accordance with the load and the stiffness of the spindle, the self-aligning bearing moves into alignment with the bowing of the spindle and the outer race of the thrust bearing is moved in the enlarged bore an amount equal to the bowing of the spindle at the inner race of the thrust bearing, this displacement of the thrust bearing from the theoretical center line of the bore and to the center line of the bowed spindle enabling the thrust bearing to equally accept the end thrust on the spindle while the radial bearing is also aligned with the bow of the loaded spindle.

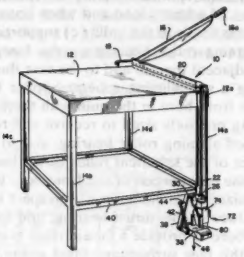
12. The method of forming and making a heavy-duty live center having a workpiece capacity of 35 tons and greater, the steps including: (a) forming a hollow quill of determined configuration; (b) forming and supplying a rotatable spindle and carrying this spindle in the bore of the quill and with this quill in mounted condition having a work load supporting and extending beyond the quill and shaping the intermediate portion of the spindle so as to provide sufficient clearance between the bore and spindle allowing the spindle to bow with the application of a heavy load and when bowed by this load the spindle turns freely in the quill; (c) supporting and mounting a self-aligning roller bearing on the foreportion of the spindle and adjacent thereto and to the rear thereof supplying and mounting a self-aligning spherical roller thrust bearing; (d) forming a front bore in the quill with the front portion of the bore being precisely sized to receive and retain the outer race of the self-aligning roller bearing, and to accommodate the outer race of the spherical roller thrust bearing additionally forming the rear portion of this front bore to a determined amount oversized in its diameter with respect to the diameter of the outer race of this thrust bearing, and forming the rear of this front bore to provide a face surface normal to the axis of the bore, this face surface providing a stop surface for the rear face of the outer race of the thrust bearing; (e) providing and mounting antifriction bearing means on the rear of the spindle and carrying this bearing means in the bore of the quill, this bearing means adapted to receive and support the rear of the spindle; (f) providing a biasing means on the rear of the spindle and in association with the bearing means this biasing means provides a determined preload to the bearings carried in the front bore of the quill; (g) providing a shoulder on the foreportion of the spindle, said shoulder adapted to engage the inner race of the self-aligning bearing and as urged by the applied preload the spindle and this bearing is drawn rearwardly and as this bearing is moved rearwardly its inner race moves the inner race of the spherical roller thrust bearing rearwardly to cause the outer race of the thrust bearing to be brought into sliding engagement with the inner rear face surface of the front bore, and (h) providing a sealing means in association with the spindle and front bore of the quill to close the front bore to dirt, coolant and the like and retain the grease in the bearings without contamination and when a heavy load is placed on the extending end of the spindle, the spindle is bowed in accordance with the load and the stiffness of the spindle, the self-aligning bearing moves into adjusted alignment with the bowing of the spindle and said outer race of the thrust bearing moves in the enlarged bore an amount equal to the bowing of the spindle at the inner race of the thrust bearing, this displacement of the thrust bearing from the theoretical center line of the bore and to the center line of the bowed spindle enabling the thrust bearing to equally accept the end thrust on the spindle while the radial bearing is also aligned with the bow of the loaded spindle.

3,987,694
CLAMP BAR AND ADJUSTABLE STOP FOR CUTTING BOARD
William Kaufman, 4 Stonehurst Court, Pomona, N.Y. 10970
Filed Feb. 6, 1975, Ser. No. 547,645
Int. Cl.² B26D *5/10, 7/04*
U.S. Cl. 83—453 **7 Claims**

1. Clamping means for cutting board assembly including a cutting board having a cutting edge and a knife mounted for shearing movement along said cutting edge; said clamping means comprising:

a clamp bar extending across said cutting board spaced from and substantially parallel to said cutting edge, said clamp bar having a flat bottom surface,

means for moving said clamp bar between an elevated retracted position and a lowered clamping position, and including an upwardly-biased foot pedal, coupling means connecting said foot pedal to said clamp bar for movement of said clamp bar to said lowered clamping position when said foot pedal is depressed and movement of said clamp bar to said elevated retracted position when said foot pedal is released, and a stop member mounted above said foot pedal and having a portion overlying said foot pedal for limiting upward travel thereof and consequently establishing the retracted position of said clamp bar,



an aligning strip secured to said clamp bar, and having opposed top and bottom surfaces and a portion projecting from said clamp bar toward said cutting edge, said projecting portion having a guide edge registering with the cutting edge of said cutting board,

said aligning strip being secured to said clamp bar with its top surface flush against the flat bottom surface of said clamp bar, whereby the bottom surface of said aligning strip engages materials to be cut and clamps said materials against said cutting board when said clamp bar is brought to its clamping position.

3,987,695

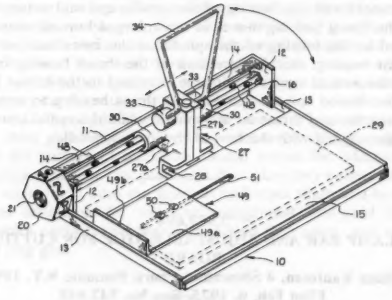
HOLE PUNCH DEVICE FOR SELECTIVELY PUNCHING DIFFERENT ARRAYS OF HOLES IN SHEET MATERIAL

Hildaur L. Neilsen, 2 Juniper St., Metuchen, N.J. 08840

Filed Dec. 22, 1975, Ser. No. 642,990

Int. Cl.² B26F *1/02*

U.S. Cl. 83—522 **9 Claims**



1. A hole punch device comprising a frame, a multi-faced bar rotatably carried by said frame in a horizontal position, a punch head slidable along said bar, plural punch head positioning means on plural faces of said bar, and said punch head including positioning means; said positioning means of each of said plural faces selectively coacting separately with said positioning means of the punch head to position the latter successively in plural hole punching positions.

3,987,696

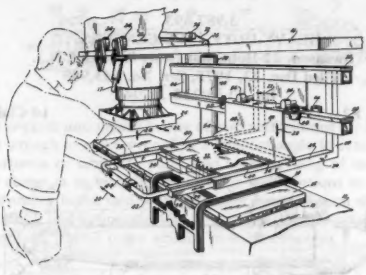
DIE PRESS WITH MOVABLE DIE CARRIAGE HAVING CONTROLS THEREON

Edgar Haas, New York, N.Y., and Edward Kottsieper, Dresden Mills, Maine, assignors to Herman Schwabe Industries, Brooklyn, N.Y.

Filed Mar. 5, 1975, Ser. No. 555,523

Int. Cl.² B26F *1/40*

U.S. Cl. 83—532 **11 Claims**



1. A die press for performing operations on material comprising a support upon which the material is placed, a pressure member, said member being movable toward and away from said support, means for moving said member, means for controlling said moving means, a die, a die carriage upon which said die is mounted, said carriage being situated between said member and said support and being movable relative to said support, said controlling means being situated on said die carriage at a portion thereof remote from the path of movement of said member.

3,987,697

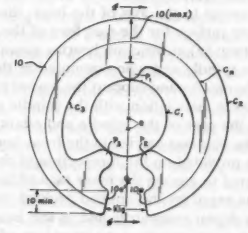
FRICTION-GRIP SELF-LOCKING RETAINING RING AND SHAFT COMBINATION

Hugo Wurzel, New York, N.Y., assignor to Waldes Kohinoor, Inc., Long Island City, N.Y.

Continuation of Ser. No. 374,489, June 28, 1973, abandoned. This application Mar. 10, 1975, Ser. No. 556,927

Int. Cl.² F16B *21/00*

U.S. Cl. 85—8.8 **2 Claims**



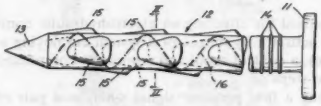
1. The combination of a grooveless cylindrical shaft-form member and an open-ended retaining ring self-locked at three spaced points along its arcuate length solely by friction to the external surface of said member at a desired location therealong thereby providing an artificial machine-part retaining and/or locating shoulder projecting radially from said surface, said retaining ring comprising a planar open-ended annular ring body of psring metal whose outer edge extends along the major arc of a circle which is concentric with and whose diameter is approximately 2½–5 times the diameter of the circle defined by the cross-section of said cylindrical shaft-form member and whose inner edge is eccentric to said outer

edge in direction such that the ring-body section heights decrease progressively from its middle section to near its open ends, and said ring body being provided along its said inner edge with three prongs which project radially inwardly from said annular ring-body proper into the ring-body opening, one said prong projecting from the ring-body middle section and the two remaining prongs projecting from the ring-body end sections, said prongs terminating at their inner ends in sharply radiused tips frictionally gripping said shaft-form member in point contact, and the radial length of said prongs causing said tips to grip the cylindrical surface of said shaft-form member with such force as to self-lock said retaining ring solely by said frictional grip to said external surface.

3,987,698
NAIL HAVING DEFORMED SHANK

Karl Lars Gunnar Rabe, Hagersten, Sweden, assignor to Nordisk Kartro Aktiebolag, Sweden

Filed Apr. 10, 1975, Ser. No. 566,703
Claims priority, application Sweden, Apr. 10, 1974, 7404902
Int. Cl.² F16B *15/06*
U.S. Cl. 85—21 **4 Claims**



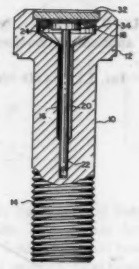
1. A one-piece nail comprising:
a. an enlarged head;
b. a pointed tip;
c. a shank interconnecting said head and said tip, said shank having four longitudinally straight sides; and
d. a series of uniform elongated protruding embossments, the direction of the elongation being parallel to the longitudinal axis of said shank, said embossments being disposed on said four sides and arranged in a single helical pattern in which pattern successive embossments are angularly offset 90° from each other, there being a space devoid of any embossment between any two adjacent embossments on any one side in longitudinal registration with an embossment on the opposite side, whereby the successive embossments in a helix of the pattern are disposed on adjacent ones of said sides with four embossments being in each revolution of the helix.

3,987,699
OPTI-MECHANICAL DISPLACEMENT MICROINDICATOR

Charles H. Popenoe, 6307 Wiscasset Road, Bethesda, Md.

Filed Nov. 14, 1974, Ser. No. 523,681
Int. Cl.² F16B *31/02*; **G01D** *21/00*
U.S. Cl. 85—62 **21 Claims**

1. A displacement microindicator for indicating small relative displacement between two external elements in the form of a thin sealed container comprising a light transmitting window portion through which light may pass, an opposite wall portion, and a flexible portion joining said window portion and said opposite wall portion closely adjacent to each other in fluid-tight fashion while permitting relative movement therebetween, a light-absorbing fluid within said sealed container and capable of flowing between said window portion and said opposite wall portion, said container containing essentially only said fluid, means for attaching said window portion to one external element, and means for attaching said opposite wall portion to another external element so that relative displacement between the two elements varies the

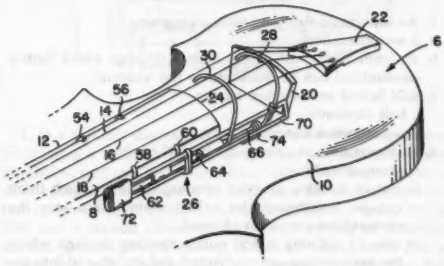


thickness of a layer of said fluid between said window portion and said opposite wall portion and consequently the amount of light passing therethrough.

3,987,700
ADJUSTABLE BOW GUIDE

Daniel Dunlap, 32 W. 69th St., Apt. 3-A, New York, N.Y. 10023

Filed Dec. 4, 1975, Ser. No. 637,584
Int. Cl.² G10D *1/02*
U.S. Cl. 84—283 **12 Claims**



1. A bow guide for a musical instrument of the violin family having strings stretched longitudinally along a raised fingerboard and over a bridge spaced longitudinally from the end of the fingerboard comprisng:
first and second stop members adapted to extend laterally over at least some of the strings of the instrument at longitudinally spaced locations to constrain the bow to movement substantially perpendicular to the strings and within a relatively narrow longitudinal range between the bridge and the end of the fingerboard; and
means for supporting said firt and second stop members from said fingerboard, said supporting means comprising means for firmly gripping said fingerboard, and means frictionally securing said stop members to said gripping means and permitting longitudinal adjustment of said stop members relative to the fingerboard while said gripping means firmly grips said fingerboard;
whereby the musician playing the instrument can rapidly adjust the position of the longitudinal range within which the bow can contact the strings.

3,987,701

AMMUNITION CONVEYOR CHANNEL FOR AN AUTOMATIC FIRING WEAPON

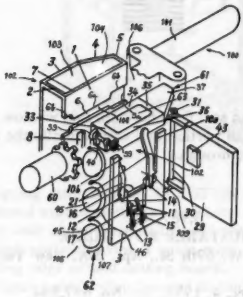
Fredy Tschui; Ernst Hürlemann, both of Zurich, and Jürg Zellweger, Neerach, all of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed May 9, 1975, Ser. No. 575,946

Claims priority, application Switzerland, May 16, 1974, 6706/74

Int. Cl.² F41D 9/02

U.S. Cl. 89—33 C 1 Claim



1. An automatic firing weapon comprising:

a. a weapon barrel;

b. an ammunition conveyor channel through which belted ammunition can be delivered to the weapon;

c. said belted ammunition having

i. belt elements,

ii. ammunition carried thereby;

d. said ammunition conveyor channel having

i. channel walls,

ii. means defining an inlet opening through which there can be introduced the belted ammunition into the ammunition conveyor channel,

iii. means defining a first outlet opening through which the ammunition can be ejected and introduced into the weapon barrel,

iv. means defining a second outlet opening through which there can be ejected the belt elements out of the ammunition conveyor channel,

v. a cover member arranged to extend substantially transversely with respect to the direction of conveying of the ammunition through the ammunition conveyor channel comprising

1. frame means formed of four walls, said frame means defining said second outlet opening,

2. means defining a pivot shaft for the cover member,

3. two brackets secured at one wall of the frame means and rotatably mounted at said pivot shaft,

vi. said pivot shaft being connected at the outside of a wall of the conveyor channel and extending substantially transversely with respect to the lengthwise axis of the ammunition, the cover member can be pivoted about said pivot shaft into an open position for the removal of the ammunition delivered through the inlet opening and not ejected through the first outlet opening into the weapon barrel.

3,987,702

METHOD AND DEVICE FOR ELECTROHYDRAULIC CONTROL OF A HYDRAULIC ACTUATOR

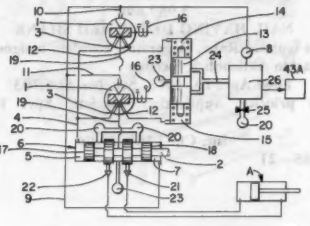
Holm Diethard Boss, and Hans Albert Butschek, both of Munich, Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Division of Ser. No. 173,525, Aug. 20, 1971, Pat. No. 3,834,279. This application July 19, 1974, Ser. No. 490,132

Claims priority, application Germany, Aug. 21, 1970, 2041681

Int. Cl.² F01B 25/26; F15B 13/042

U.S. Cl. 91—1 2 Claims



1. A method for effecting an electrohydraulic control of a hydraulic actuator by means of a system employing a pair of servovalves, a control spool and a pressure comparator, comprising the steps of:

producing a first pressure signal when said pair of servovalves are in a first condition and supplying said first pressure signal directly to one end of an elongated housing slideably supporting said control spool therein;

producing a second pressure signal from a central pressure medium supply and supplying same to the opposite end of said elongated housing and effecting an application of force to one side of said control spool equal to the force applied to the opposite side of said control spool by said first pressure signal, a rendering of said forces unequal causing said control spool to move in said housing to effect a control of said hydraulic actuator;

producing a pair of third pressure signals when at least one of said servovalves is moved to a second condition; and

supplying each of said third pressure signals to spaced locations on a pressure comparator, issuing fourth pressure signal from the comparator, and operating an alarm means in response to said fourth pressure signal.

3,987,703

COMBINED RESTRICTOR AND DEAD ENGINE LOWERING VALVE

Eugene E. Latimer, Wilmington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 12, 1974, Ser. No. 496,477

Int. Cl.² F15B 11/16, 13/06

U.S. Cl. 91—6 5 Claims

1. In a hydraulic control system the combination comprising:

a first load-lifting hydraulic motor;

a first pilot-operated directional control valve for directing fluid for operation of said first motor;

a pilot valve for operating said first directional control valve; a second hydraulic motor;

a second pilot-operated directional control valve for selectively directing fluid to a pair of motor control passages leading to said second motor;

a first pump communicating pressurized fluid to said first and second directional control valves and providing a source of pressurized fluid for operation of said first motor;

a second pump connected to the inlet of said second directional control valve and to said pilot valve for providing a first source of pilot fluid;

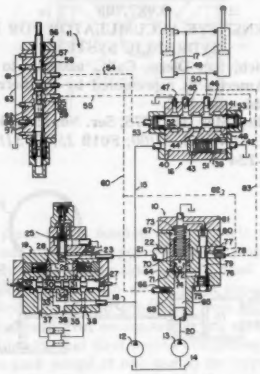
a shuttle valve assembly including a valve housing having first and second parallel bores formed therein,

an inlet communicating said first bore with the load side of said first hydraulic motor and an outlet communicating said first bore with the inlet of said pilot valve for providing a second source of pilot fluid,

a first spool disposed in said first base for controlling fluid flow between said inlet and said outlet defining said first shuttle valve and normally biased by a spring means to an open communicating position between said inlet and said outlet,

an inlet communicating said second pump coaxially with said second bore at one end thereof,

a first outlet passage of said second bore for communicating fluid from said inlet to said pilot valve,



a second outlet passage of said second bore for communicating fluid from said inlet of said second bore to said first bore at one end of said first spool for biasing said first spool to a blocking position,

a third outlet passage of said second bore in said valve housing for communicating said second bore with said second direction control valve, and,

a second spool reciprocably mounted in said second bore and normally biased by a spring means to a first position for blocking communication of fluid between the inlet and the third outlet of said second bore, said second spool being actuatable to a second position in response to fluid from said second pump to direct a portion of said fluid therefrom to said second direction control valve and provide a second source of pressurized fluid to said second directional control valve.

3,987,704

FLUID SYSTEM OF A WORK VEHICLE HAVING FLUID COMBINING MEANS

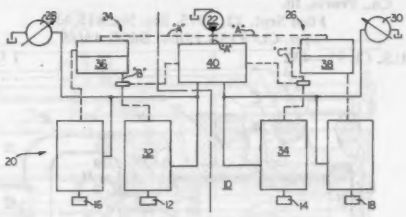
Howard L. Johnson, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 27, 1976, Ser. No. 662,077

Int. Cl.² F15B *13/06, 13/09*

U.S. Cl. 91—412 **8 Claims**

1. In a fluid system of work elements of a work vehicle having a pilot pump and first and second fluid circuits, each fluid circuit having a pump connected to a respective work element through a control valve assembly for controlling the flow of fluid from the respective pump to the respective work elememt and a pair of primary pilot control valves each positioned between the pilot pump and a respective control valve assembly for altering a pilot pump signal, delivering a resultant signal, and controlling the operation of the respective control valve assembly, the improvement comprising:



means for controllably passing fluid between the first and second fluid circuits, said means being responsive to preselected biasing forces and said resultant signals from the first and second primary pilot control valves.

3,987,705

DEVICE FOR OPENING AND CLOSING A MOLD IN A MOLDING MACHINE

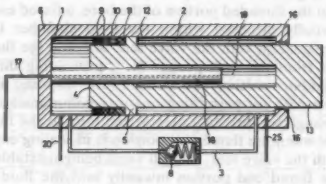
Herbert Strassheimer, Bischofsheim, Germany, assignor to GNK Windsor G.m.b.H., Bischofsheim, Germany

Filed Oct. 11, 1974, Ser. No. 514,285

Claims priority, application Germany, Oct. 12, 1973, 2351222

Int. Cl.² F15B *15/17;* **F16J** *9/00*

U.S. Cl. 91—416 **10 Claims**



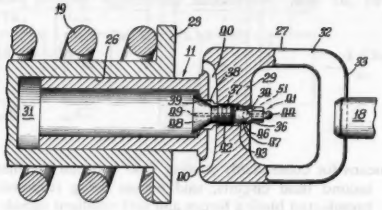
1. In a molding machine, a hydraulic mold-operating device comprising a cylinder having an axis and an internal surface parallel to said axis and circumferentially bounding a space; a differential piston mounted in said space for axial reciprocation relative to said cylinder and subdividing said space into a first and a second chamber, said piston having an external surface parallel to said internal surface of said cylinder and a piston rod extending through said second chamber to the outside of said cylinder, means for admitting pressure fluid into and discharging the same from said first chamber so as to control the amount and pressure of said fluid in said first chamber; means for establishing communication between said chamber, including a communicating conduit through which said fluid flows from said first into said second chamber when the pressure in the former exceeds that in the latter; and means for interrupting communication between said chambers when the pressure in said second chamber exceeds that in said first chamber, including a one-way valve in said communicating conduit, and sealaing means interposed between said external surface of said piston and said internal surface of said cylinder, said sealing means including at least one deflectable sealing lip portion which is deflected into fluid-tight contact with one of said surfaces when said second chamber contains said fluid at a higher pressure than said first chamber by the action of such higher-pressure fluid, while said sealing lip portion permits said fluid to seep between the same and said one surface from said first into said second chamber when the former contains said fluid at a higher pressure than the latter.

3,987,706

FILL AND RELIEF VALVE ARRANGEMENT

Ara L. Corrigan, Dunlap, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 22, 1975, Ser. No. 615,439
Int. Cl.² F15B *13/04*; B62D *55/18*
U.S. Cl. 91—432 1 Claim



1. A fill and relief valve arrangement for the introduction of fluid into and the selective venting of fluid from a variable fluid chamber, comprising;

a body disposed at one end of the variable volume fluid chamber and having an open-ended bore formed therein with one end of the bore opening into the fluid chamber, a valve seat formed at said one end of the bore, and a vent port communicating the bore with the atmosphere, said bore including a smooth bore portion at the other end thereof and a threaded portion intermediate the ends; and

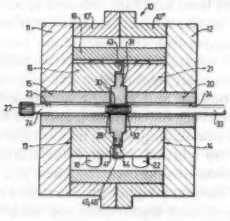
a fill valve having a fluid flow path extending axially therethrough, an externally threaded portion screw threaded into the threaded portion of the bore, a flared end portion partially disposed within the fluid chamber in sealing engagement with the valve seat isolating the fluid chamber from the vent port, a stem protruding through the fluid bore portion, and a check valve disposed in the fluid flow path for permitting one-way communication therethrough for directing pressurized fluid to the fluid chamber when the flared end portion is in sealing engagement with the valve seat, said fill valve being rotatable to move the flared end portion inwardly into the fluid chamber away from said valve seat for venting the fluid chamber to the atmosphere.

3,987,707

MULTIPLE-UNIT PUMP

Paul Bosch, Ludwigsburg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed May 9, 1975, Ser. No. 576,195
Claims priority, application Germany, May 20, 1974, 2424390
Int. Cl.² F01B *13/06*
U.S. Cl. 91—492 10 Claims



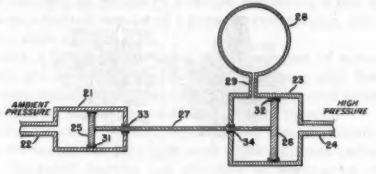
1. A multiple-unit pump, comprising a housing; a first and at least one coaxial second pump unit in said housing, at least said first pump unit being a radial piston pump having a fixedly mounted first cantilevered supporting shaft, a cylinder body rotatably mounted on said first supporting shaft and provided with radial cylinder bores, and pistons reciprocable in said cylinder bores, said second pump unit having a fixedly mounted second cantilevered supporting shaft and a rotary body coaxial with said cylinder body, rotatably mounted on said second supporting shaft and having a fluid chamber means; an axial bore in said first supporting shaft of said first pump unit; a drive shaft for said second pump unit extending through said axial bore; a coupling member mounted on said drive shaft for rotation therewith and being located between said first and second supporting shafts and intermediate said cylinder body and said rotary body; cooperating coupling portions on said coupling member and said bodies so that said coupling member and said bodies rotate jointly; and means communicating said bores and chamber means with the exteriors of said bodies for admission and discharge of fluid being pumped.

3,987,708

DEPTH INSENSITIVE ACCUMULATOR FOR UNDERSEA HYDRAULIC SYSTEMS

Richard Uhrich, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 10, 1975, Ser. No. 556,604
Int. Cl.² F16L *55/00*; F01B *25/02*, *31/00*
U.S. Cl. 92—134 2 Claims



1. In an underwater hydraulic system having a pressurized working fluid, an improved pressure regulator comprising:

first cylinder means for confining a predetermined volume;

first piston means having two faces and slidably retained within said first cylinder means for dividing said first cylinder into two compartments;

duct means extending through one wall of said cylinder means and communicating with the exterior thereof for establishing ambient pressure on one face of said first piston means within one of compartment of said first cylinder means;

a volume of low pressure gas confined within the second compartment of said first cylinder means for exerting a low pressure restorative force on the second face of said first piston means;

second cylinder for confining a second predetermined volume;

second piston means having two faces and slidably retained within said second cylinder means into two compartments;

gas accumulator means effectively connected to said second cylinder means to expose one face of said second piston means to a high gas pressure;

conduit means effectively connected to said second cylinder and for connection to the aforesaid underwater hydraulic system such as to expose the second face of said second piston means to the pressurized working fluid thereof; and

rigid coupling means effectively joining the second face of said first piston means and the first face of said second piston means for unitary movement,

whereby ambient pressure exerted on the first face of said first piston is coupled in an additive fashion to the second piston such that the pressurized working fluid has a pres-

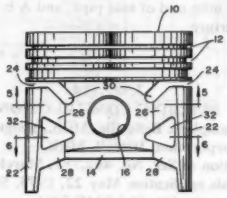
sure equal to the pressure of the gas accumulator means plus the ambient pressure.

3,987,709

PISTON

Ray E. Day, 340 Lakeland, Grosse Pointe, Mich. 48236

Filed Apr. 7, 1975, Ser. No. 565,767
Int. Cl.² F16J 1/04
U.S. Cl. 92—232 3 Claims



1. A one piece piston formed from a single material comprising a head, a pair of opposed boss-carrying supports depending from two opposite sides of said head, a pair of opposed skirt sections beneath said head at the remaining two opposite sides thereof and separated from each other and from said head, and strut means supporting said skirt sections from said supports, said strut means comprising a first upper pair of struts each joined at one end to the upper end of one skirt section and at the opposite end to the adjacent support, a second upper pair of struts each joined at one end to the upper end of the other skirt section and at the opposite end to the adjacent support, said first and second upper pairs of struts slanting downwardly from the skirt section to the support, a first lower pair of struts each joined at one end to the lower end of said one skirt section and at the opposite end to the adjacent support, a second lower pair of struts each joined at one end to the lower end of said other skirt section and at the opposite end to the adjacent support, said first and second lower pairs of struts slanting upwardly from the skirt section to the support, the struts of said first and second upper pairs being bent to an acute angle opening radially outwardly so as to be flexible and thus to flexibly support the upper end of said skirt sections from said boss-carrying supports, and the struts of said first and second lower pairs being bent to an angle of 90° or more opening radially outwardly so as to be less flexible than the struts of said first and second upper pairs and to less flexibly support the lower ends of said skirt sections from said boss-carrying supports.

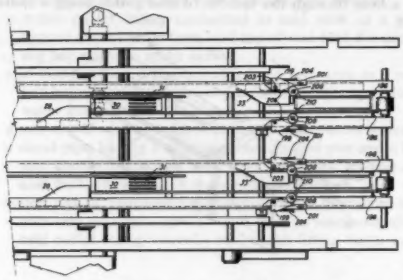
3,987,710

CARTON SQUARING MECHANISM IN A CASE ERECTOR

Donald G. Reichert, Tarpon Springs, Fla., assignor to ABC Packaging Machine Corporation, Tarpon Springs, Fla.

Division of Ser. No. 496,028, Aug. 9, 1974, Pat. No. 3,952,636. This application Jan. 21, 1976, Ser. No. 650,948
Int. Cl.² B31B 1/02
U.S. Cl. 93—36 SQ 3 Claims

1. In a case erecting machine apparatus for squaring the sides of cases being moved along a preselected path, said apparatus comprising a case stop; means for positioning said stop along said path; a pair of mounting plates pivotally mounted to opposite sides of said path; spring means biasing said mounting plates inwardly towards said path; and a pair of



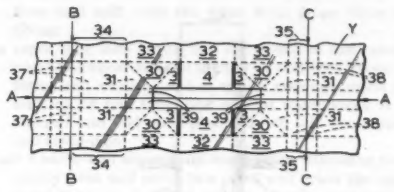
rollers rotatably supported upon said mounting plates for rotatable engagement with the sides of the cases.

3,987,711

FORMATION OF LAMINATED PACKAGING BLANKS

Stanley Milton Silver, London, England, assignor to Paxall, Inc., Chicago, Ill.

Division of Ser. No. 347,464, April 3, 1973, Pat. No. 3,883,068. This application Apr. 9, 1975, Ser. No. 566,417
Claims priority, application United Kingdom, Apr. 10, 1972, 16351/72; Aug. 1, 1972, 35779/72; Nov. 4, 1972, 50956/72
Int. Cl.² B31B 15/60
U.S. Cl. 93—36.6 6 Claims



1. A method for forming and sealing a moisture-resistant package using a foldable blank made of a fibrous material substrate laminated by a heat-weakenable laminant to moisture-resistant sheeting, the blank having at least one unsupported sheeting portion along at least one free edge of said blank, wherein the method includes the steps of folding said blank so that said unsupported portion lies adjacent another region of said sheeting, applying heat and pressure directly to said unsupported portion while it is in contact with said other sheeting region to seal it thereto while simultaneously melting the laminant by which said other sheeting region is adhered to said substrate and detaching same therefrom, and folding and sealing said detached substrate to complete the formation of a part of the package.

3,987,712

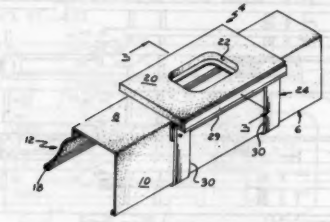
FIXTURE FOR CUTOUTS IN DRAIN TROUGHS

Paul J. Croteau, Springfield, Mass., assignor to David A. Sylvester, Hackensack, N.J., a part interest

Filed June 9, 1975, Ser. No. 585,178
Int. Cl.² B23C 1/20; B27C 5/10
U.S. Cl. 90—11 C 6 Claims

1. Method of making cutouts through the bottom of sheet metal gutters comprising the steps of attaching to the gutter a rigid fixture which includes a generally planar template portion and mounting brackets, imparting rigidity to said gutter by affixing said fixture about said gutter with the brackets

engaged with the upper edges of the side walls of the gutter and the template clamped against the bottom wall of the gutter, said template including a hole therethrough, and cutting a hole through the bottom of said gutter using a router



with a cutting bit having a cutting outer tip, said router having a collet surrounding said bit, said template supporting the base of the router with the collet spaced from the bottom of said gutter when in cutting position.

3,987,713

AIR JET NOZZLE AND SYSTEM

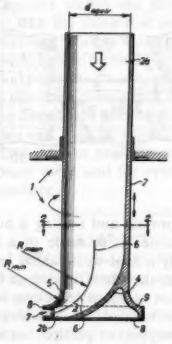
Birger Larkfeldt, Odensjo-Barnarp, and Lennart Widerby, Jonkoping, both of Sweden, assignors to Aktiebolaget Svenska Flaktfabriken, Nacka, Sweden

Filed Feb. 21, 1975, Ser. No. 551,757

Claims priority, application Sweden, Feb. 25, 1974, 7402503

Int. Cl.² F24F *13/02*

U.S. Cl. 98—40 N **6 Claims**



1. A room-air distributing air-jet nozzle system for the quiet injecting of a high-velocity low-volume air jet into the air of a room to control the distribution and flow of said room air, comprising:

a long straight pipe having an inlet end for receiving an inlet air flow, having an air-transporting central portion with a substantially straight axis of symmetry for receiving and conveying said air flow, and having an outlet portion responsive to said air flow from said central portion to form said jet and deliver it to said room;

said outlet portion comprising a closure extending generally across the outlet end of said pipe, and an air outlet aperture facing substantially radially outward with respect to said axis of symmetry for directing said jet into said room substantially at right angles to said axis;

said air outlet having a cross-sectional dimension extending substantially at right angles to said axis;

a first part of the inner wall of said closure portion being turned smoothly outwardly with a radius of curvature R_{min}, the upper boundary of said aperture being formed by the terminal portion of said outwardly-turned first part of said inner wall;

said outlet portion having a second inner wall part, on the opposite side of the interior thereof from said outlet aperture, which second inner wall part is smoothly concave toward said outlet aperture;

a line extending from said axis of symmetry of said central pipe portion to the center of said aperture along points midway between said first and second wall parts having a radius of curvature R_{mean};

said nozzle being configured so that the ratio R_{mean}/d_{equiv} has a value from ½ to 1 inclusive, the ratio R_{min}/d_{equiv} has a value from ¼ to ½ inclusive, and the ratio d^2_{equiv}/A has a value from 5 to 10 inclusive;

wherein d_{equiv} is the equivalent cross-sectional inner diameter of said inlet end of said pipe, and A is the area of said outlet aperture.

3,987,714

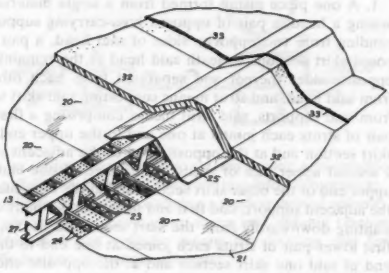
BUILDING CONSTRUCTION

Henry Fred Campbell, Belleville, Mich., assignor to Campbell Research Corporation, Detroit, Mich.

Continuation of Ser. No. 452,751, March 20, 1974, abandoned. This application May 22, 1975, Ser. No. 580,065

Int. Cl.² F24F *7/04*

U.S. Cl. 98—40 D **18 Claims**



8. In a building construction, the combination comprising

a plurality of spaced parallel beams extending generally horizontally,

means for supporting said beams,

and a plurality of panels extending between said beams,

the length of said panels being greater than the width of said panels and the length of said panels extending between transverse beams,

means associated with at least one of said beams and defining a duct enclosing said beam for the passage of air,

said panels having openings therethrough communicating with said duct such that air passing through said duct may pass downwardly and inwardly to the interior of the building,

said panels comprising spaced sheets and truss members interposed between said sheets,

one of said sheets facing externally and the other internally of the building,

portions of said external sheet terminating in spaced relation to the end of the panel such as to provide direct communication with said duct,

the internal sheet having a plurality of openings therein for the passage of air,

said truss members extending longitudinally of said panels.

3,987,715

APPARATUS FOR THE AUTOMATIC PREPARATION OF BEVERAGES AND LIQUID FOODS

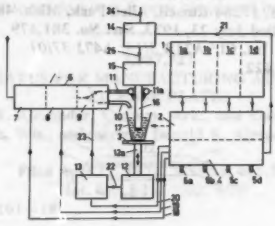
Walter E. Muller, Widen, Mutschellen, Switzerland, assignor to AVAG Betriebsverpflegungs A.G., Zurich, Switzerland

Filed June 19, 1975, Ser. No. 588,206

Claims priority, application Switzerland, June 28, 1974, 8907/74

Int. Cl.[2] C12H *1/06*

U.S. Cl. 99—275 8 Claims



1. In an apparatus for automatically dispensing a liquid composition, such as beverages, liquid foods and the like prepared from water and ingredients, having a storage device for a plurality of open containers for the composition, a device for delivering one container at a time from the storage device to a mixing station, a device for supplying water to each container at said station including measuring means for measuring out a predetermined quantity of water according to the capacity of the containers, and means at said station for mixing such predetermined quantity of water with the composition ingredients, said mixing means comprising a generator for producing electrical oscillations in the frequency range of sonic and ultrasonic vibrations, a converter for converting the electrical oscillation into mechanical vibrations, transmission means for transmitting the mechanical vibrations from the converter to the water to be mixed with the ingredients, and means for introducing said transmission means into the interior of said container, the improvement characterised in that:

a. the mixing of the water with the ingredients takes place in each container which already contains the igredients necessary for the particular compositon to be prepared therein;

b. the mixing means comprises as said transmission means, a rod-shaped sonotrode with a downwardly directed free end, and, as said means for introducing the sonotrode into the container, a device for producing a relative movement between the sonotrode and container to introduce the sonotrode free end through the container opening for immersion in the water and remove the same therefrom;

c. the container delivering device is provided with means foir delivering each container to said relative movement producing device; and

d. the device for supplying the water has at least one outflow duct terminating in an outlet adjacent the periphery of the sonotrode that the water flowing from said duct flows down the sonotrode into the container and thereby cleans the sonotrode.

3,987,716

APPARATUS FOR REDUCING ESCAPE OF WATER VAPOR FROM COFFEE MAKERS

Walter R. Lorang, 2239 W. Maple Road, Walled Lake, Mich. 48088

Filed Dec. 8, 1975, Ser. No. 638,539

Int. Cl.[2] A47J *31/00*

U.S. Cl. 99—279 2 Claims

1. Apparatus for reducing the escape of water vapor from a coffee making machine comprising,

a tank having a closed bottom and a top,

a cover lid on said top of said tank closing said tank to atmosphere,

a heating element in said tank adjacent said bottom,

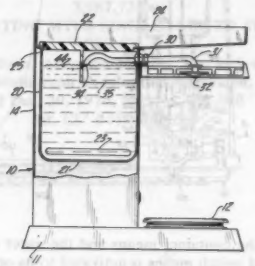
a water outlet fitting connected in said tank at a point spaced downwardly from said top of said tank for supplying hot water to make coffee;

said outlet fitting draining water from said tank to a point just below said fitting thereby establishing the operational water level of said tank;

a pan above said tank for receiving displacement water,

a stand-pipe having a top connected to said pan and a bottom connected to said tank; said stand-pipe leading into said tank adjacent said bottom of said tank;

water poured into said pan running down said stand-pipe into said tank raising the water level in said tank above said outlet fitting whereby said outlet fitting emits water



from said tank until the water level drops below said fitting;

a vapor tube loop having one end sealed in said cover in communication with the interior of said tank above said fitting and a second end in spaced communication with said top of said stand-pipe so that water vapor is discharged into said stand-pipe and into said pan adjacent said stand-pipe;

and a baffle wall around said outlet fitting extending downwardly from said cover to a point well below the operational water level of said tank surrounding and isolating said outlet fitting from the main body of the water surface in said tank outside said baffle wall;

water vapor rising from water in said tank outside of said baffle wall moving into said looped tube and being cooled to liquid in said looped tube, pan, and stand-pipe, and reintroduced to said tank by said stand-pipe to maintain the water in said tank at a satisfactory operational level.

3,987,717

AUTOMATIC COFFEE BREWING MACHINE

Karl H. Bergmann, Cherry Hill, N.J., and Harvey Levine, Fairfield, Conn., assignors to Melitta, Inc., Cherry Hill, N.J.

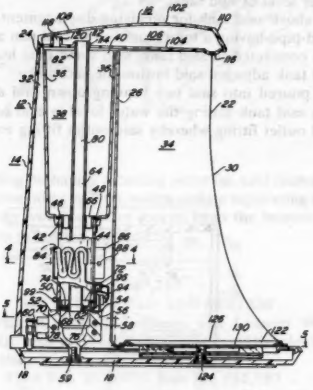
Continuation-in-part of Ser. No. 490,063, July 19, 1974, abandoned. This application Oct. 10, 1975, Ser. No. 621,390

Int. Cl.[2] A47J *31/56*

U.S. Cl. 99—280 20 Claims

1. In an automatic coffee brewing machine of the type having a structure with container means for receiving cold water at the start of a brewing operation and dispensing hot water at the end of the brewing operation, a control means comprising heating means for heating a container means and the water received therein, a switch means for sensing the temperature of said container means and the water contained therein and having an open position and a closed position, said switch means being activated to its closed position when sensing a temperature below a predetermined first value and being activated to its open position when it senses a temperature above a predetermined second value higher than said first

value, electrical connecting means joining said switch means with said heating means for providing energization of said heating means when said switch means is in its closed position, and a heating element for heating said switch means to a temperature between said first and second values when said switch means is in its open position, so that when said switch means is in its closed position at the start of a brewing operation the heating means is energized through said switch means



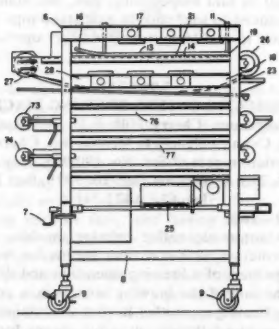
to heat the container means and the water contained therein until said switch means is activated to its open position when the temperature of said container means exceeds said second value after which said heating element maintains the temperature sensed by said switch means at a level between said first and second values which prevents said switch means from being activated to its closed position and reheating said container before the start of a new brewing operation.

3,987,718

HAMBURGER PATTY AND BUN COOKER

Nils Lang-Ree, Los Altos, and Edward D. Baker, San Francisco, both of Calif., assignors to NPI Corporation, Burlingame, Calif.

Filed July 23, 1975, Ser. No. 598,339
Int. Cl.² A47J *37/04*
U.S. Cl. 99—386 **2 Claims**



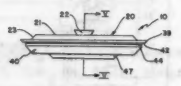
1. A hamburger patty and bun cooker comprising a frame, a horizontally extending upper patty broiler platen mounted on said frame, a horizontally extending lower patty broiler platen having side portions, means for mounting said lower platen on said frame below said upper patty broiler platen and defining a space therebetween, means on said frame for heating said platens, an endless conveyor mounted on said frame with one run of said endless conveyor disposed to advance through said space, said endless conveyor including at least one cross member, means providing a low-friction layer in said space between said side portions of said lower platen, and means for supporting said cross member on said side portions of said lower platen and out of contact with said low-friction layer.

3,987,719

COOKING UTENSIL

Leonard Kian, 17284 Russell, Allen Park, Mich. 48101

Filed July 23, 1973, Ser. No. 381,479
Int. Cl.² A21B *3/13;* **A47J** *37/01*
U.S. Cl. 99—422 **7 Claims**



1. A cooking utensil adapted for cooking a pizza from a batter comprising, in combination:

a first member having a surface thereon for receiving said batter, said surface being generally circular in configuration and having a central imperforate planar area, and an upwardly and outwardly directed peripheral side wall, and supporting means extending from and formed adjacent the perimeter of said side wall; an annular recess surrounding said planar area at the juncture of said imperforate planar area and said side wall, said recess providing a thickened quantity of said batter around the periphery of said pizza to form a thickened edge crust on the pizza during cooking;

a circular base member having a lower surface thereon for supporting said base member and first member above a heating surface; means defining a central opening in said lower surface to allow the admittance of heat directly therethrough; a peripheral side wall extending outwardly and upwardly from said lower surface, said side wall terminating in an outer peripheral flange, said flange being adapted to receive said supporting means on said first member, said first member being supported above said lower surface and forming a heating chamber within said base member when said supporting means is so received;

a cover member, said cover member having an annular peripheral lip thereon adapted for sealing engagement with said supporting means on said first member; said cover member and said first member cooperatively forming an oven chamber above said heating chamber;

said first member side wall being spaced from said outwardly and upwardly extending side wall on said base member when said utensil is assembled and having a plurality of spaced openings formed therethrough whereby heat is transferred from said heating chamber through said openings into said oven chamber above said planar surface area for cooking batter thereon.

3,987,720

NO DRIP PIE PLATE

Geraldine A. Hill, Sutton West, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,174
Int. Cl.² A47J *27/58, 37/01*
U.S. Cl. 99—433 **1 Claim**

1. A no drip pie plate, comprising a standard pie plate, wherein:

a flexible foil flap radially extends from the outer edge of the lip and is folded down against the bottom of the lip

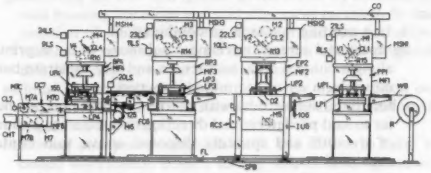
and on a side of the pie plate, whereby the flap can be lifted to retain juices from a pie placed in the pie plate.

3,987,721

APPARATUS FOR MANUFACTURING AUTOMOBILE LICENSE PLATES

Donald R. Alexander, Conway, Ark., and Carl W. Johnson, Neenah, Wis., assignors to Donald R. Alexander, Conway, Ark.

Filed Apr. 17, 1974, Ser. No. 461,721
Int. Cl.[2] B21J *9/02, 9/20*
U.S. Cl. 101—18 **6 Claims**



1. Apparatus for forming discrete differently embossed segments from a continuous web of sheet material movable through said apparatus in a predetermined direction comprising:

a punching press for providing at least one mounting hole in each segment;

an embossing press;

embossing means for cooperation with said embossing press and having a support frame and an assembly of embossing elements in the form of relatively rotatable rings on said support frame, each ring having a series of embossing characters on the obverse side and a series of pin engaging means on the converse side;

indexing means for moving said rings at successive intervals of time, said indexing means comprising an indexing arm swingable through a ring advance stroke and a return stroke, clutch units on said indexing arm and having clutch pins extendable to engage said pin engaging means on said rings to advance said rings in a predetermined order at successive intervals of time, said indexing means further comprising lock units on said support frame having lock pins extendable to engage said pin engaging means and prevent rotation of said rings;

a rimming press for forming web advancement means in said web;

a blanking press for severing segments from said web;

a feed conveyor spaced from said embossing press in said predetermined direction and located between said rimming press and said blanking press for engagement with said web advancement means to draw said web in stages through said presses;

each of said presses having an open position and a closed position;

independently operable drive means for each of said presses, for said indexing means and for said feed conveyor; and

control means for effecting operation of each said drive means and responsive to the positions of said presses and of said indexing means to enable operation of said presses, said indexing means and said feed conveyor in a predetermined sequence;

said control means comprising cam switch means responsive to movement of said indexing arm for effecting operation of said feed conveyor to move said web during intervals of time while any of said rings is being rotated, for effecting operation of said presses during intervals of time while said web and rings are stationary, for effecting extension of said clutch pins and retraction of said lock pins in predetermined order to enable rotation of said rings, and to effect retraction of said clutch pins and extension of said lock pins to prevent ring rotation;

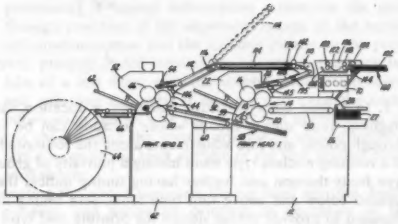
said control means further comprising limit switches on said presses to prevent operation of said presses, feed conveyor and indexing means unless said presses are in open position.

3,987,722

DUAL PRINTING WITH SINGLE MASTER SUPPLY SOURCE

Eber Lyle Goodwin, Arlington Heights, Ill., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Dec. 30, 1974, Ser. No. 537,088
Int. Cl.[2] B41L *45/06*
U.S. Cl. 101—91 **20 Claims**



1. Duplicating apparatus comprising:

first and second print heads;

means to feed copy sheets to the print heads, each copy sheet first to the first print head and then to the second;

a single master supply comprising a plurality of masters and being the sole source of masters for both of said print heads;

means for taking one master from the supply and conveying it to one of said print heads;

means for taking an immediately following master from the supply and conveying it to the other print head;

means for operating the print heads to print on the copy sheet first from said one master and then from the other;

means for interrupting the printing operation after a desired number of copies have been produced; and

means for sequentially and repetitively removing the masters from the print heads, and activating said taking and conveying means to provide a replacement master on each head after each printing operation;

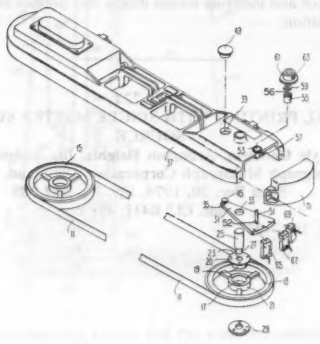
whereby the arrangement of images on the printed copy sheets can be precontrolled for a series of printing runs by the arrangement of the masters relative to each other in a single master supply.

3,987,723

PHASE ADJUSTMENT MECHANISM FOR USE WITH A MAGNETIC READ STATION OF A BAND PRINTER

Frank A. Mahoney, Wyncote, and Ronald W. F. Hutley, Lansdale, both of Pa., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Mar. 27, 1975, Ser. No. 562,701
Int. Cl.² B41J 1/20
U.S. Cl. 101—111 3 Claims



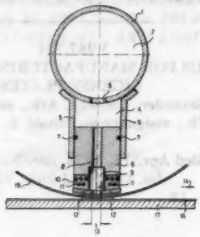
1. In a type band cartridge assembly, a location varying magnetic read station means whose location can be varied through coarse and fine adjustments along the rotational path of a rotating endless type band having a plurlaity of groups of type fonts thereon and further having timing indicia thereon located below and above said type fonts, said timing indicia disposed to provide timing signals for printing said type fonts as well as for defining the beginning of said different groups of type fonts and which said endless type band is employed with an impact printer device, said read station comprising in combinataion: a cartridge housing, pulley shafts in said cartridge housing for supporting said endless type band, base plate means having at least one aperture and a well-like structure therein, said aperture formed to fit over a pulley shaft about which said base plate means can be at least partially rotated; at least three magnetic read means formed to read said indicia and disposed so that only one indicium is read at any one time, said read means disposed on said base plate means to be in close proximity with said endless type band as it moves along its rotation path; first eccentric means having an offcenter aperture therein formed and disposed to be rotationally engaged within said cartridge housing whereby when said first eccentric means is rotated around said off-center aperture, said base plate means is rotated for a coarse adjustment thereof in response thereto about said at least one aperture; second eccentric means having a shaft with an eccentric shoe member formed integral therewith and knob means for rotating said shaft, said shaft being disposed to fit through said off-center aperture, said shoe member formed and disposed to fit into said well-like structure in said base plate means whereby when said shoe member is moved by said first eccentric means or said knob means of said second eccentric means moving said shoe member, said base plate member is moved thereby enabling alternatively a coarse adjustment or a fine adjustment respectively of the location of said read station along the path lying in close proximity to said path of said rotating endless type band.

3,987,724

STENCIL INKER WITH RESILIENT APPLICATOR PORTION

Peter Zimmer, Untere Sparchen 54, A 6330 Kufstein, Austria

Filed Jan. 28, 1974, Ser. No. 437,039
Claims priority, application Austria, Feb. 1, 1973, 886/73
The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.
Int. Cl.² B41F 15/40, 15/44
U.S. Cl. 101—119 8 Claims



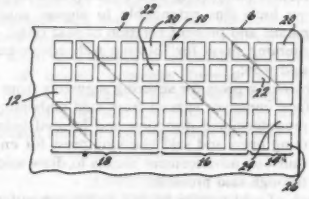
1. In a printing machine, in combination:
an apertured screen overlying a substrate to be imprinted along a contact area, said screen and said substrate being movable in a predetermined direction;
a horizontal supply tube with an axis in a plane perpendicular to said predetermined direction connected to a source of dyestuff and spacedly disposed above said contact area; and
a dyestuff applicator mounted on said tube and resting upon said screen, said applicator being provided with a bottom portion engaging said screen and forming an outlet along a narrow zone of said contact area centered on a vertical axial plane of said tube, said bottom portion being compressible in a vertical direction while being substantially less deformable in a horizontal plane than in said vertical direction, said outlet communicating with the interior of said tube.

3,987,725

PROCESS OF SCREEN MANUFACTURE AND USE FOR CODING CREDIT CARDS

John R. Scantlin, Los Angeles, Calif., assignor to Transaction Technology, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. Nos. 223,272, Feb. 3, 1972, Pat. No. 3,802,101, and Ser. No. 273,434, July 20, 1972. This application Mar. 18, 1974, Ser. No. 451,997
Int. Cl.² B41C 1/14; B41N 1/27
U.S. Cl. 101—128.4 21 Claims



12. A process for forming a credit card sheet having coded information printed thereon for a plurality of credit cards to be formed from said sheet, said process comprising:
placing a sheet of photographic film in contact with a flat table with an exposure head positioned relative to the table;

forming first and second locating openings in said film when said film is in a flattened condition;

said first opening being positioned adjacent a corner of the film;

the second opening positioned adjacent a corner of the film and diagonally opposite from the first opening and the second opening defining an elongated slot having an axis which coincides with a diagonal axis passing through the first and second locating openings;

sequentially exposing small predetermined coded spaces on said film by actuating the exposure head to expose a small space on the film, then causing relative movement between the table and head in exposing a new place on the film until all of the desired coded spaces on said film are exposed;

developing the exposed film to provide darkened spaces on the film corresponding to the exposed coded spaces;

placing the developed film against a fine mesh screen positioned within a frame;

said screen having a coating thereon of a light-sensitive emulsion and means on said screen frame defining diagonally positioned alignment means whose placement corresponds to the placement of the first and second locating openings as formed in said film;

positioning the film wth respect to the frame by coaction of said locating openings and said alignment means to fix the position of the first locating opening with respect to the frame and screen and to fix the position of said diagonal axis with respect to the frame screen;

shining a light through the film to expose the emulsion on the screen except at the locations of the coded darkened spaces on the film;

removing unexposed emulsion from the screen to form a coded information screen having information apertures therein which corresponds in size and location to the darkened spaces on the developed film;

placing the coded screen in a silk screen press;

said press including locating means whose placement corresponds with the placement of said alignment means;

positioning the screen on the press by coaction of said locating means with said alignment means;

passing ink through the apertures in the coded information screen onto a credit card sheet to form screen printed first encoded information spaces on a credit card sheet with a first coded information screen;

screen printing second encoded information spaces on the credit card sheet with a second coded information screen; third encoded information spaces with a third coded information screen until all of the desired information spaces have been printed with successive screen printings;

each of said coded information screens having substantially identical alignment means for positioning of each screen with respect to the silk screen press with the alignment of each coded information screen with the press being maintained through coaction of the locating means of the press and the alignment means on the screen;

forming a coded test screen for use in the alignment of the information screens on the press;

said coded test screen having coded test apertures therein corresponding to all of the predetermined spaces on said film for copending of information;

said information screens each having coded information apertures therein corresponding to less than all of the predetermined coded spaces on said film for encoding information;

said credit card sheet having offset printing on its front surface which defines locating symbols and a plurality of credit card areas;

said coded test screen having locating apertures whose location with respect to said coded test apertures is the same as the location of the locating symbols with respect to the credit card areas on the front surface of the credit card sheet;

said coded test apertures in each test screen having a uniform size which differs uniformly from the size of the uniform coded information apertures in the information screens;

positioning said coded test screen on a silk screen press through coaction of the locating means on the press and the alignment means on the test screen and screen printing the back surface of said credit card sheet to form a test sheet having a pattern of test spaces thereon by passing ink through test apertures and forming locating areas thereon by passing ink through the locating apertures;

shining a light through said test sheet to check the alignment of said locating areas with respect to said locating symbols;

adjusting the press if necessary to bring the position of the printed locating areas into alignment with the locating symbols and screen printing a test sheet with the locating areas aligned with the locating symbols;

positioning a first information screen on the press through coaction of the alignment means on the information screen and the locating means on the press and screen printing encoded information spaces on the back surface of a test sheet;

comparing the location of the screen printed encoded information spaces with the location of the screen printed coded test spaces on the test sheet;

adjusting the press if necessary to bring the screen printed coded information spaces into uniform alignment with the screen printed coded test spaces on the test sheet before the screen printing of first information spaces on the back surface of a plurality of credit card sheets;

removing the first information screen from the press and positioning a second information screen on the press through coaction of the alignment means on the second information screen and the locating means on the press;

screen printing coded information spaces on the back surface of a test sheet with the second information screen and adjusting the press if necessary to align the coded information spaces with the coded test apertures on the test sheet before the screen printing of second information spaces on the back surface of the first printed credit card sheets;

repeating the above sequence during third printing, fourth printing, and successive printings as necessary on the back surface of the credit card sheets with a third information screen, a fourth information screen, and successive information screens as necessary for said successive printings by using test sheets to check the position of the third information screen, fourth information screen and said successive information screens before beginning each screen printing,

whereby the coded information spaces on the credit card sheets are formed by multiple silk screenings with the test sheets being used to ensure that the coded information spaces printed by each silk screening are in proper alignment with the coded information spaces printed by each of the other silk screenings and that the coded information spaces are also in proper alignment with credit card areas defined on the front surface of the credit card sheets.

3,987,726

OFFSET ROTARY PRESSES

Louis Corse, Orleans, France, assignor to Societe d'Etudes de Machines Speciales, France

Filed Oct. 23, 1974, Ser. No. 517,301

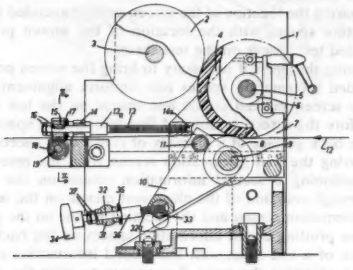
Claims priority, application France, Oct. 24, 1973, 73.37904

Int. Cl.² B41F *13/34*

U.S. Cl. 101—218 **2 Claims**

1. In an offset rotary press, a frame, bearings permanently mounted on the frame, an engraved cylinder rotatably mounted in the said bearings, a blanket cylinder rotatably

mounted tangential to the engraved cylinder, a counterpart cylinder tangential to the blanket cylinder and situated below the blanket cylinder, two movable vertical and longitudinal side plates bearing the blanket cylinder and the counterpart cylinder and mounted slidably in a longitudinal and in a horizontal direction on said frame, two longitudinal and horizontal screw-threaded bars screwed at their inner ends into respective movable side plates, reversible means for simultaneously rotating the two threaded bars and setting up a simultaneous sliding movement in the two movable side plates, first devices and second devices integral respectively with the outer ends of the threaded bars and with supporting points affixed to the frame, compression springs compressed between said first and second devices and the respective supporting points to exert a tractive axial force in an outward direction on each threaded bar and on the side plate associated therewith to produce the required contact pressure between the blanket cylinder and engraved cylinder, said supporting points comprising on each side of the frame, and for each screw-threaded bar, a longitudinal bearing supported by the frame in which a corresponding threaded bar is rotatably mounted, said first and second



devices comprising a toothed wheel on each threaded bar secured on an outer end of the corresponding threaded bar, a collar on each threaded bar positioned on the other side of the longitudinal bearing, in relation to the worm wheel to block outward axial movement of the corresponding threaded bar on the corresponding longitudinal bearing, the reversible means for simultaneously rotating the two screw-threaded bars comprising a transverse shaft rotatably mounted in the frame, two transverse worms integral with the transverse shaft axially spaced thereon respectively engaging the toothed wheels integral with the threaded bars, a sleeve rotatably journaled on the transverse shaft, a radial finger affixed to said sleeve, a fixed stop mounted on the frame and with which the radial finger can come in contact on each side of the stop, an operating flywheel mounted to slide axially on the transverse shaft, a key rendering the operating flywheel rotationally integral with the shaft, a spring which constantly thrusts the operating flywheel in the direction of the sleeve, the flywheel having integral therewith a hub normally engaging said sleeve and provided with axial projections for engaging notches distributed over the engaged surface of the sleeve.

3,987,727

APPARATUS FOR SUPPLYING PRINTING INK TO A PRINTING UNIT

Richard E. Thatcher, Chesterfield, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed June 10, 1975, Ser. No. 585,672

Int. Cl.² B41F *31/02*

U.S. Cl. 101—366 **5 Claims**

1. Apparatus for delivering printing ink from a tubular cannister filled with said ink to a printing unit which comprises

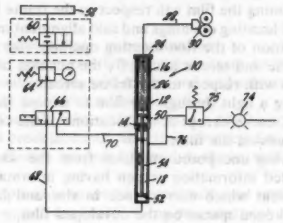
an elongated casing, there being means in said casing intermediate the ends thereof for dividing the interior of said casing into first and second axially disposed compartments,

a capping plate, said capping plate being removably connected to one end of said casing whereby an ink filled tubular cannister can be insertably received coaxially within one of said compartments and removed therefrom when empty,

ink conveyance conduit means extending from said capping plate to said printing unit and communicatively connecting said one compartment with said printing unit,

a plunger disposed in said one compartment of said casing for sliding travel between a first operative position wherein said plunger is disposed in a position remote from said casing one end to a second operative position wherein said plunger is disposed in a position adjacent said one end and vice versa, said plunger during travel from said first to said second operative positions thereof moving through said cannister and forcing printing ink therefrom through said ink conveyance conduit means,

means for stroking said plunger between its first and second operative positions at substantially constant rate of travel, said stroking means comprising



a piston disposed in the other of said casing compartments for sliding travel therein, said piston having opposite side faces, said plunger being fixed to said piston for unitary travel therewith, said piston being movable between first and second operative positions corresponding to those of said plunger, said piston in its first operative position being disposed in a position adjacent the other end of said casing and in its second operative position remote from said casing other end, one of the side faces of said piston being in communication with the said other end of said casing,

a source of compressed air,

compressed air supply conduit means for communicating compressed air from said source to said one face of said piston, and

a regulator for maintaining the pressure of the air flowing from said source through said compressed air supply conduit means at substantially constant level, and

means for retracting said plunger from its second to first operative positions, said retracting means comprising second compressed air supply conduit means for communicating compressed air from said source to the other face of said piston.

3,987,728

RELIEF PRINTING PROCESS

Howard A. Miller; Kenneth L. Smith, both of Rochester, and Peter M. Stacy, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 18, 1974, Ser. No. 507,030

Int. Cl.² B41C *1/06*

U.S. Cl. 101—426 **6 Claims**

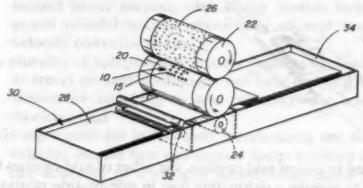
1. A typographic printing process comprising the steps of:

a. exposing a matrix sheet including a layer of a film forming colloid material to an imagewise pattern of activating energy;

b. subjecting the exposed matrix sheet to a development process which produces a differential pattern of surface adhesivity in the exposed and unexposed areas of said colloid material;

c. transferring the adhesive areas of the matrix sheet to a flexible support having a thickness of from approximately 10 microns to approximately 125 microns;

d. applying a mono-layer of substantially uniformly sized, non-friable granular particles having a diameter of from about 40 microns to about 80 microns to the adhesive



areas of said support to form a low relief printing form of from approximately 50 microns to approximately 200 microns in thickness; and

e. alternatively bringing said printing form into pressure contact with (1) an inking member having on at least one surface thereof a uniform layer of a non-liquid pressure transferable marking material to transform a stratum of said marking material to the printing surfaces of said printing form and (2) a paper receiver sheet to transfer at least a portion of said stratum of marking material from said printing surfaces to said receiver sheet.

3,987,729

DEVICE FOR FIRING AN ELECTRIC DETONATOR

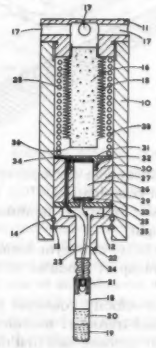
Jeremy Charles Andrews, Salcoats, and Gordon Brian Roger Shannon, Dundonald, both of Scotland, assignors to Imperial Chemical Industries Limited, London, England

Filed Oct. 15, 1974, Ser. No. 515,017

Claims priority, application United Kingdom, Oct. 31, 1973, 50605/73

Int. Cl.² F42B *3/12*; F42C *11/02*

U.S. Cl. 102—22 R **5 Claims**



1. A firing assembly for firing an explosive charge underwater, comprising a sealed waterproof housing having a wall portion formed by a bellows element deformable in response to external pressure on the housing, a piezo-electric transducer element positioned within said housing so as to be compressible by the deformation of said bellows element, and an electric detonator having a fusehead electrically connected in circuit with said piezo-electric transducer element whereby said detonator is fired when the bellows element is sufficiently deformed by said external pressure to cause the said transducer element to generate the required voltage.

3,987,730

IRON AND LEAD-CONTAINING COMPOSITE METAL SHOT

Frederick Weldon Meadus; Bryan D. Sparks, and Ira E. Puddington, all of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 338,563, March 6, 1973, Pat. No. 3,900,317. This application Feb. 3, 1975, Ser. No. 546,431

Claims priority, application Canada, Mar. 4, 1974, 193992

Int. Cl.² F42B *7/00*; B22F *3/16*, *7/00*, *7/04*

U.S. Cl. 102—42 R **13 Claims**

1. Composite metal bird shot of substantially theoretical density and reduced toxicity comprising iron and lead wherein the iron is a separate phase in discrete or porous matrix form, surrounded and interpenetrated by the lead phase, the lead phase being selected from lead and lead alloyed with up to about 5% weight based on the composite of an alloying element aiding wetting of the iron surfaces, and wherein the separate iron phase is present in from about 25 to about 90% weight of the composite.

3,987,731

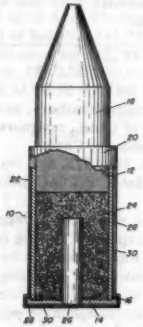
COMPOSITE PROTECTIVE COATING FOR COMBUSTIBLE CARTRIDGE CASES

John Brzuskiewicz, Dolton, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 16, 1976, Ser. No. 649,625

Int. Cl.² F42B *5/04*

U.S. Cl. 102—43 R **4 Claims**



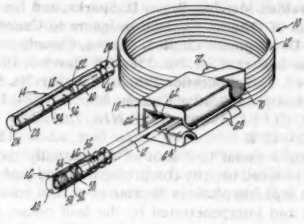
1. A porous combustible cartridge case comprising nitrocellulose, reinforcing fibers and a resinous binder, wherein at least the exterior surface of the case is covered with a composite protective coating comprising an undercoating consisting essentially of a polyvinyl alcohol resin and a topcoating consisting essentially of a vinylidene chloride-acrylonitrile copolymer resin.

3,987,732

NON-ELECTRIC DOUBLE DELAY BOREHOLE DOWNLINE UNIT FOR BLASTING OPERATIONS

Richard William Spraggs, Simsbury, and Ernest Laird Gladden, Granby, both of Conn., assignors to The Ensign-Bickford Company, Simsbury, Conn.

Filed Feb. 10, 1975, Ser. No. 548,520
Int. Cl.[2] C06C 5/06
U.S. Cl. 102—27 R 9 Claims



1. A preassembled non-electric double delay borehole downline unit for sequential firing blasting operations for delaying both initiation of a charge within a first borehole after the signal has been received therein and passage of signal transmission down a second borehole and toward succesive boreholes comprising a length of flexible impulse propagating tubing having first and second ends and an impulse propagating hollow channel extending along the length thereof, a non-electric high strength blasting cap containing a first delay element connected to said first end for initiation by an impulse traveling along said channel and for initiating the borehole explosive charge within said first borehole, an impulse amplifying and transmitting cap containing a second delay element connected to said second end for initiation by an impulse traveling along said channel and for delaying signal transmission beyond said transmitting cap, said delay elements being comprised of pyrotechnic material having different time delay periods with said first delay element having a substantially longer time delay period than said second delay element and a protective block having a plurality of elongated apertures with one of said apertures fully and snugly receiving said amplifying cap therein.

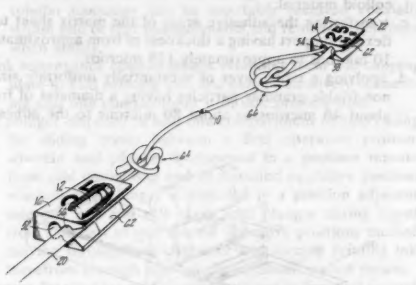
3,987,733

MILLISECOND DELAY SURFACE CONNECTOR

Richard William Spraggs, Simsbury, and Ernest Laird Gladden, Granby, both of Conn., assignors to The Ensign-Bickford Company, Simsbury, Conn.

Filed Feb. 10, 1975, Ser. No. 548,292
Int. Cl.[2] C06C 5/06
U.S. Cl. 102—27 R 15 Claims

1. A bidirectional millisecond delay surface connector suited for trunkline explosive blasting operations comprising a flexible detonation transmitter duct having a length of about one half foot and more and providing a hollow elongated interior gas channel, said duct having means about the periphery of said channel for sustaining a percussion wave at high velocity along the length of said duct, a delay cap connected to each end of said duct and terminating said channel, each of said caps comprising an elongated tubular shell of rigid material having a closed terminal end portion, a layer of explosively inert material within said shell at said terminal end portion, a delay element within said shell and a detonating charge intermediate said delay element and said explosively inert layer, said channel facing generally toward said delay element for directing said wave toward said element, said delay element being in propagative relationship with said duct and said detonating charge, said detonation transmitter duct being incapable of side initiating a detonating cord and of being initiated by said delay element, and a protective block for housing each cap, said block having a pair of elongated cavities in side-by-side communicating relationship, said cap being retentively



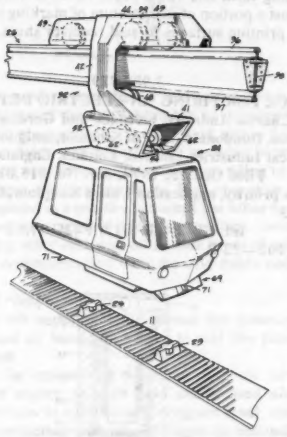
received in one of said cavities, the other of said cavities being suited to receive a detonating fuse in side-by-side relationship with said cap.

3,987,734

MODULAR RAPID TRANSPORTATION SYSTEM FOR PASSENGERS AND FREIGHT

Clifford V. Horn, 457 Lake View, Redwood City, Calif. 94062

Filed Feb. 5, 1975, Ser. No. 547,212
Int. Cl.[2] B61K 1/00
U.S. Cl. 104—88 26 Claims



1. A transportation system for conveying passengers and freight comprising in combination,

a plurality of passive transport modules for receiving passengers and freight,

a first constant-velocity conveyor means for receiving and carrying said transport modules at a velocity in a first direction,

a second constant-velocity conveyor means for receiving and carrying said transport modules at a velocity in a second direction opposite said first direction, said second conveyor means being oriented in a spaced-apart, substantially parallel relationship with said first conveyor means in a station region,

a first transfer means for removing transport modules from the first constant-velocity conveyor means and carrying them to a loading/unloading platform located between said first and second conveyor means in the station region and for placing said transport modules removed from said

first constant-velocity conveyor means onto said second constant-velocity conveyor means,

a second transfer means for removing transport modules from said second constant-velocity conveyor means and carrying them to said loading/unloading platform and for placing said transport modules from said second constant-velocity conveyor means onto said first constant-velocity conveyor means wherein the first and second transfer means each include

a continuous rail structure located between said first and second constant-velocity conveyor means in the station region, said continuous rail structure having a first and second linear section, each linear section being disposed parallel to and above one of said constant-velocity conveyor means,

a plurality of independent transfer vehicles each adapted to travel on said continuous rail structure and having means for attaching to and releasing said transport modules, and

driving means for individually accelerating the transfer vehicles on said first and second linear sections of said rail structure to a velocity substantially equal to the velocity of the constant-velocity conveyor thereunder,

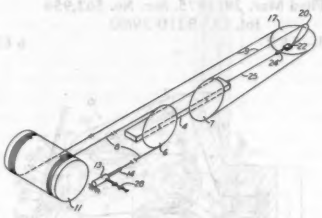
said passive transfer modules being transferred from said first and second constant-velocity conveyor means to said transfer vehicles in the first linear sections of said continuous rail structures, being carried by the transfer vehicles to the loading/unloading platform, being unloaded, being reloaded, then being carried by said transfer vehicles into said linear sections of said continuous rail structures and being transferred from said transfer vehicles onto the oppositely moving, constant-velocity conveyor means.

3,987,735

RAILWAY CAR SPOTTING SYSTEM

Gerard V. Lofink, Coraopolis, Pa., assignor to Heyl & Patterson, Inc., Pittsburgh, Pa.

Filed Aug. 21, 1975, Ser. No. 606,358
Int. Cl.² B61J *3/06*
U.S. Cl. 104—176 **7 Claims**



1. A railway car spotting system comprising a carriage movable back and forth along a track parallel to a railway track, means on the carriage for engagement with an end of a car on the track, a pair of sheaves rotatably mounted on the carriage, first and second anchor means disposed at opposite ends of the carriage track, a first wire rope secured at one end to the first anchor means and extending therefrom toward the carriage and around one of said sheaves and back toward the first anchor means, a second wire rope secured at one end to the second anchor means and extending therefrom toward the carriage and around the other sheave and back toward the second anchor means, means connected to the other ends of the ropes for pulling on either rope while simultaneously paying out the other one to thereby pull the carriage along its track, means for temporarily releasing from the second anchor means the end of the rope secured thereto, and means for detachably connecting the carriage with said released rope end so that when the carriage is pulled by the first rope the carriage will pull the released second rope across its anchor means and towards the first anchor means to take up slack in the ropes.

3,987,736

REUSABLE PNEUMATIC DUNNAGE DEVICE

William Don Miller, Pismo Beach, Calif., assignor to Gordon M. Newby, Huntsville, Mo., a part interest

Filed Mar. 17, 1975, Ser. No. 558,803
Int. Cl.² B60P *7/14, 7/16;* **B61D** *45/00, 49/00*
U.S. Cl. 105—491 **9 Claims**

1. A dunnage device, comprising:

a. elongate flexible tube means for holding a compressible fluid;

b. a pair of elongate stop members disposed adjacent said tube means on opposite sides thereof, the maximum width of said stop members in a dimension substantially perpendicular to a line drawn through the centers of said tube and both stop members being less than the maximum width of said tube in the same dimension when said tube is filled with said compressible fluid and fully expanded; and

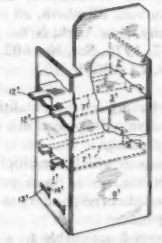
c. holding means connecting said tube means and said stop members together for holding said stop members adjacent said tube means, said holding means having a center portion wrapped around said tube means and two outer portions on opposite sides thereof wrapped around said stop members.

3,987,737

COLLAPSIBLE DISPLAY STAND

Irving Smith, 135-24 62nd Ave., Flushing, N.Y. 11367

Continuation-in-part of Ser. No. 341,776, March 15, 1973, abandoned. This application July 15, 1974, Ser. No. 488,802
Int. Cl.² A47B *43/02*
U.S. Cl. 108—111 **4 Claims**



1. A collapsible display stand comprising: a back wall, two side walls hingedly attached to said back wall, and a plurality of shelf members each hingedly attached along a first edge to said back wall in vertically spaced relationship, at least one of said shelf members having an extension attached to a second edge opposite said first edge, said extension extending from side wall to side wall and normally extending downwardly of said shelf member and between said shelf walls, each of said shelf members having biasing means attached thereto and to

the side walls to establish a normally generally horizontal biased position of said shelf members braced in contract with said shelf members upwardly against said back wall when said side walls are swung around behind said back wall, each of said shelf members having outwardly extending tabs on the side edges thereof which contract said side walls and said side walls having slots therein aligned with said outwardly extending tabs such that said tabs can extend through said slots.

3,987,738

SEAL FOR A TRAVELING GRATE

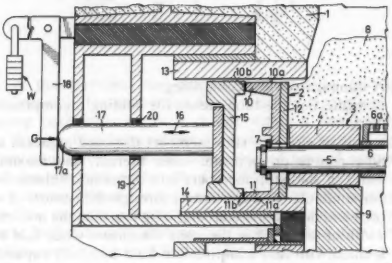
Reinhard Korting, Neubeckum, Germany, assignor to Polysius AG, Neubeckum, Germany

Filed May 14, 1975, Ser. No. 577,198

Claims priority, application Germany, May 27, 1974, 7418352[U]

Int. Cl.² F23H *11/00*; F27D *3/00*

U.S. Cl. 110—40 E **5 Claims**



1. In a traveling grate construction having a housing through which an endless grate chain is movable, the improvement comprising sealing lips carried by said chain and projecting outwardly from opposite sides thereof, each of said sealing lips having a generally vertically disposed sealing surface; sealing means supported by said housing at opposite sides of said chain for movements into and out of engagement with said sealing surface of the associated sealing lip; and means biasing each of said sealing means into engagement with the associated sealing lip.

3,987,739

SINGLE PATTERN CONTROL OF SEWING MACHINES

John Whilldin Wurst, Dover; Robert Conrad Hauf, Upper Montclair; Robert Louis Sedlatschek, Bridgewater, and Stephen Alexander Garron, Elizabeth, all of N.J., assignors to The Singer Company, New York, N.Y.

Filed Aug. 7, 1975, Ser. No. 602,693

Int. Cl.² D05B *3/02*

U.S. Cl. 112—158 E **5 Claims**

5. A sewing machine having instrumentalities for forming a succession of stitches individually placed in a selected pattern, said sewing machine including:

a. static memory means in which a multiplicity of separate digital code words are stored in a predetermined sequence with each word corresponding to one individually placed stitch in a pattern;

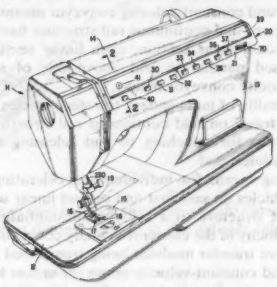
b. switch means arranged accessible to a sewing machine operator on said sewing machine, and effective to impress on said static memory a signal identifying as a starting word in a pattern a specific one of said multiplicity of separate digital code words which correspond to individually placed stitches;

c. means for providing timing pulses related to the formation of successive stitches formed by said sewing machine;

d. counter means coupled to said static memory means and utiliizing said timing pulses for addressing digital code words in said static memory means in said predetermined sequence beginning with said starting word identified by said switch means signal;

e. last stitch signaling means effective automatically to return said counter to a condition addressing said starting word identified by said switch means signal to repeat said predetermined sequence;

f. actuating means coupled to said static memory means and operatively connected to said stitch forming instrumentalities and responsive to said predetermined sequence of digitally coded words addressed by said counter means for influencing said stitch forming instrumentalities to form a pattern in response thereto;



g. means for inhibiting the operation of said stitch forming instrumentalities, and;

h. a momentary contact single pattern switch means accessible to a sewing machine operator on said sewing machine for rendering operation of said inhibiting means subject to the next operation of said last stitch signaling means.

3,987,740

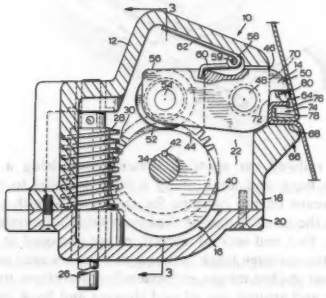
PORTABLE SEAM LOCKING DEVICE

Karol J. W. Merson, 1307 Crossfield Bend, Mississauga, Canada (L5G 3P4)

Filed Mar. 28, 1975, Ser. No. 562,954

Int. Cl.² B21D *39/02*

U.S. Cl. 113—54 R **6 Claims**



1. A portable seam locking device for forming a fold over seam joint between two metal flanges comprising,

a. a portable housing having a recessed anvil surface formed on and extending longitudinally of an outer surface thereof, said anvil surface having first and second faces disposed perpendicular to one another in an L-shaped configuration,

b. A hammer pivotably mounted in said housing for oscillating movement, between a first and second position, about a pivot axis which is disposed rearwardly from said sec-

ond face at a level above said first face in a plane parallel to the plane of said anvil surface,

c. said hammer having a head portion at one end thereof projecting outwardly from said housing to overlie said anvil surface, said head portion having a ridge portion which, when said hammer is in said first position, projects outwardly from the head portion in a direction towards said first face and is spaced outwardly from said second face of said anvil surface,

d. said hammer being pivotable in response to movement to said second position to move said ridge in an arc which curves towards both said first and second faces whereby said ridge is disposed more closely adjacent both said first and second faces when in said second positions to draw a seam joint inwardly of said housing during folding thereof by engagement with said ridge,

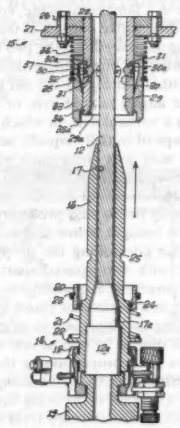
e. drive means within said housing engaging said hammer and causing said hammer to oscillate about said pivot point to move said head portion to and fro between said first and second positions, said drive means including input drive shaft means connectible to a source of rotary power.

3,987,741

REMOTE UNMANNED WORK SYSTEM (RUWS) MATING LATCH

Paul V. Tryon, Kailua, Hawaii, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 12, 1976, Ser. No. 648,220
Int. Cl.² B63G *8/00, 8/42*
U.S. Cl. 114—16 R **7 Claims**



1. Apparatus for remotely connecting a primary underwater vehicle tethered by a cable to a secondary underwater vehicle comprising:

a prod assembly mounted on the primary underwater vehicle including

an elongate prod provided with a coaxial bore sized and shaped to receive and retain the cable therein and further provided with an annular groove on its outer surface,

a collar slideably mounted on the prod in a position spaced from the annular groove and

means carried on the prod for biasing the collar toward the annular groove and

a latching assembly mounted on the secondary underwater vehicle including,

a tubular fitting having an axial bore sized to slideably receive the prod assembly therein and being provided with a plurality of openings,

at least one pawl extending through the openings and partially into the axial bore

a sleeve slideably mounted about the tubular fitting having an interior annular recess for receiving the pawl,

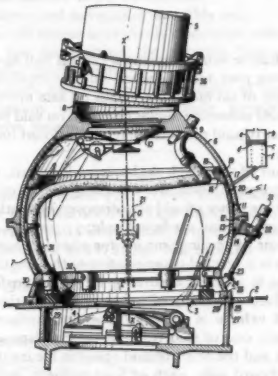
means for biasing the sleeve to a position radially aligning the pawl with the annular recess, upon insertion of the prod assembly in the latching assembly, the collar biasing means first compresses until the pawl is cammed into the annular groove on the prod at which time the force of the collar biasing means overcomes the sleeve biasing means axially displacing the sleeve to lock the pawl in the annular groove of the prod.

3,987,742

SWIVEL AIR LOCK FOR AIRTIGHT CONNECTION BETWEEN SUBMERGIBLES

Gerald M. Boisrayon, Le Beausset; Gilbert M. Martin, La Seyne sur Mer, and Jean C. Mollard, Carry le Rouet, all of France, assignors to Etat Francais represente par le Deleque Ministeriel pour l'Armement, France

Filed Feb. 4, 1975, Ser. No. 546,922
Claims priority, application France, Mar. 19, 1974, 74.09160
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² B63G *8/24*
U.S. Cl. 114—16.6 **7 Claims**



1. Connecting air lock provided on a submergible device to permit the latter to connect itself in airtight fashion around an opening of an immersed enclosure, comprising

a truncated hemispherical bell adapted to be positioned around an opening of a submergible device;

a skirt having the shape of a portion of a spherical swivel joint nested in the said bell in airtight fashion with a small amount of play for articulation around a center common to said bell and said skirt, said skirt having a peripheral joint on the end face of its end outside said bell, and at the outer periphery of its end nested in said bell, a groove in which a sealing joint is placed between said skirt and said bell,

said bell having at the inner periphery of its free end a groove containing a sealing joint, the space contained between the skirt, the bell and the two sealing joints being filled with a lubricating liquid adapted to be maintained at a pressure which is slightly different from the hydrostatic pressure,

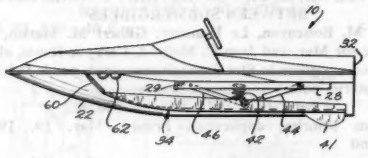
means to adjust the constant difference between the two pressures in such a manner as to cancel out the apparent weight of the swivel skirt and thus cause its hydrostatic lift in the said hemispherical bell.

3,987,743

BOAT WITH SKIS

Donald G. Pensel, Star Rte., Glens Falls, N.Y. 12801

Continuation of Ser. No. 441,985, Feb. 13, 1974, abandoned.
This application Aug. 28, 1975, Ser. No. 608,713
Int. Cl.[2] B63B 1/14
U.S. Cl. 114—66.5 R 2 Claims



1. A marine vehicle having a central hull having a long axis and having port and starboard sides, comprising

a. a pair of ski mounting means on said marine vehicle, one of said mounting means disposed on said port side and the other of said mounting means disposed on said starboard side;

b. a pair of skis, each ski having a long axis, one of said skis disposed beneath said mounting means on said port side, and the other of said skis disposed beneath said mounting means on said starboard side;

c. a pair of resilient means for allowing movement of said skis in a vertical plane relative to the length of said marine vehicle and for absorbing impacts transferred from the surface of a body of water to said marine vehicle when said vehicle is traveling over the surface of a body of water, one of said resilient means disposed on said port side and the other of said resilient means disposed on said starboard side, each of said resilient means having one end thereof positioned to act on a ski at a position substantially intermediate of the length of said ski, and the opposite end positioned to act on a mounting means on said marine vehicle; and wherein said resilient means for normal loads lifts the bottom of said central hull such that it protrudes just below the surface of a body of water;

d. a pair of stabilizing means for preventing said skis from substantial movement in a horizontal plane relative to said marine vehicle, one of said stabilizing means disposed on said port side and the other of said stabilizing means disposed on said starboard side, each of said stabilizing means being pivotally connected to an adjacent ski substantially intermediate the length thereof and also connected to an adjacent mounting means and each of said stabilizing means for allowing the ski to which it is connected to pivot relative to the hull in a vertical plane about the connection between the stabilizing means and the ski so that an angle between the long axis of the ski and the long axis of the hull may change, and

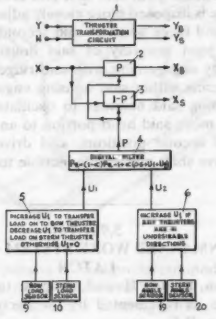
e. a pair of shock absorber means for damping out vibrations from said resilient means one of said shock absorber means disposed on said port side and the other shock absorber means disposed on said starboard side, and each of said shock absorber means being operatively connected to a ski and to a mounting means.

3,987,744

AUTOMATIC SYSTEMS FOR THE DYNAMICALLY POSITIONING OF A FLOATING VESSEL

Jonathan Mark Blumberg, Creaton, and Alan John Moore, Flackwell Heath, both of England, assignors to Gec-Elliott Automation Limited, England

Filed Nov. 22, 1974, Ser. No. 526,108
Claims priority, application United Kingdom, Nov. 27, 1973, 54879/73
Int. Cl.[2] B63H 25/04
U.S. Cl. 114—144 B 2 Claims


THRUSTER TRANSFORMATION CIRCUIT
P
I-P
DIGITAL FILTER
INCREASE U1 TO TRANSFER LOAD ON TO BOW THRUSTER DECREASE U1 TO TRANSFER LOAD ON STERN THRUSTER OTHERWISE U1=0
INCREASE U2 IF BOTH THRUSTERS ARE IN UNDESIRABLE DIRECTIONS
BOW THRUSTER ACTUATOR
STERN THRUSTER ACTUATOR
AZIM. ANGLE DEMAND
STERN THRUSTER ACTUATOR

1. A method of controlling the propulsion of an aquatic vessel equipped with two spaced-apart steerable thrusters each capable of exerting a controllably variable thrust in a desired direction in a horizontal plane, comprising the step of reproportioning the relative outputs of the thrusters contributing to thrust along an axis joining the two thrusters to maintain or to bring the output of one of these thrusters below a predetermined level without changing the net levels of thrust along said axis, at right angles to said axis, or producing a turning movement about a vertical axis, in which the reproportioning comprises the steps of initially equally setting the thrust contributions along said axis from each of the thrusters, and subsequently reproportioning thrust in one or more small increments and decrements at discrete time intervals to maintain said one output below said predetermined level, or until said one output is brought below said predetermined level.

2. Apparatus for controlling the propulsion of an aquatic vessel equipped with two spaced-apart steerable thrusters each capable of exerting a controllably variable thrust in a desired direction in a horizontal plane, comprising detection means for detecting the approach to or exceeding of a predetermined level of output by one of said thrusters, and reproportioning means for reproportioning the relative outputs of the thrusters contributing to thrust along an axis joining the two thrusters to maintain or to bring the output of said one thruster below said predetermined level without changing the net levels of thrust along said axis, at right angles to said axis, or producing a turning moment about a vertical axis, in which said reproportioning means comprises means for reproportioning thrust in a succession of small increments and decrements spaced by discrete time intervals.

3,987,745

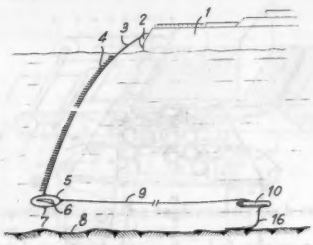
SYSTEM FOR THE EXPLORATION AND INSPECTION OF SEA 3EDS BY MEANS OF A VESSEL HAVING AN EXTERNAL POWER SUPPLY SYSTEM

Alain Chaverebiere de Sal, Paris; René Victor Donnart, Saint-Tropez, and Michel Jean Paul Darche, Ville d'Avray, all of France, assignors to Societe ECA, Asnieres, France

Filed Apr. 7, 1975, Ser. No. 565,840
Claims priority, application France, May 8, 1974, 74.15843
Int. Cl.[2] B63B 21/26
U.S. Cl. 114—235 B 6 Claims

1. A system for the exploration and inspection of a sea bed comprising a surface craft, a first underwater non-buoyant

vessel, means for automatically stabilizing the altitude of said first underwater vessel at a predetermined level relative to the sea bed, a first cable connecting said first underwater vessel to said surface craft for towing the same, and means for maintaining said first cable taut to support said first underwater vessel, a second remotely controlled self-propelling vessel having means for stabilization at the level of said first vessel and detection instruments housed therein for scanning of the



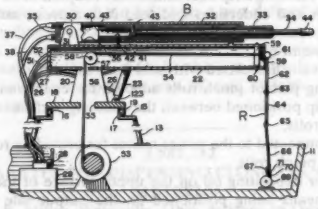
sea bed a second cable connecting said first and second underwater vessel, means for maintaining the axes of said first and second underwater vessel substantially colinearly aligned with respect to said second cable and means for transmitting energy generated on the surface craft, remote control signals from the second vessel, and detection signals from the latter to and from said surface craft and said second vessel via said first and second cables.

3,987,746

PARASAIL LAUNCHING AND RETRIEVING APPARATUS

Mark McCulloh, Key Biscayne, Fla., assignor to Sun Sports Corporation of America, Miami, Fla.

Filed Sept. 22, 1975, Ser. No. 615,421
Int. Cl.[2] B63B *21/56*
U.S. Cl. 114—235 R **10 Claims**



1. A parasail launching and retrieving apparatus comprising support means, a main boom secured at one end to said support means, an outrigger boom mounted adjacent said main boom, said outrigger boom having an extensible member for movement of one end of said outrigger boom beyond the other end of said main boom, a line extending along said main boom, means connected at one end of said line for drawing said line along said boom and parasail securing means mounted at the other end of said line and parasail engaging means for supporting said parasail mounted on said one end of said extensible member.

3,987,747

POWERED AMPHIBIOUS BICYCLE

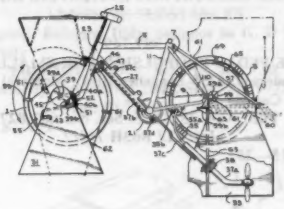
Benjamin Carter Locher, 1611 East E St., P.O. Box 720, La Porte, Tex. 77571

Filed Nov. 11, 1974, Ser. No. 522,694
Int. Cl.[2] B60F *3/00*
U.S. Cl. 115—2 **15 Claims**

1. In combination with a bicycle having front and rear wheel assemblies respectively supported from front fork means and rear lug means, and a sprocket type chain drive operatively connected to the rear wheel assembly for driving the bicycle on land, the improvement comprising aquatic support means removeably attached to the bicycle for imparting thereto a mode of operation on a body of water, said aquatic support means including:

front and rear pontoon assemblies each of which includes a fitting, each of said fittings being characterized by first and second leg means.

a first coupling means removeably affixing the front fitting to the fork means,



a second coupling means removeably affixing the rear fitting to the lug means,

a drop hanger means supported from the lug means for carrying an aquatic drive mechanism,

an aquatic drive and navigation assembly and,

a power take-off means operatively associated with the rear assembly for transmitting the rotative forces to the aquatic drive mechanism,

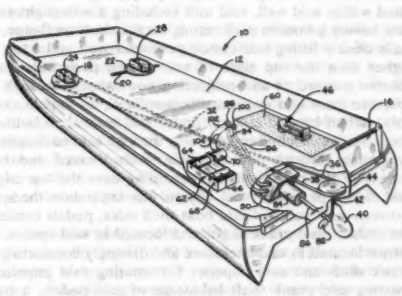
said drop hanger means fixing the stability of said power take-off means while simultaneously supporting the aquatic drive means.

3,987,748

MARINE VESSEL ADAPTED TO BE POWERED AND STEERED BY A TRANSPORTED LAND VEHICLE

Charles A. Carroll, 5860 Cowell Road, Brighton, Mich. 48116

Filed June 9, 1975, Ser. No. 585,260
Int. Cl.[2] B63H *25/00*
U.S. Cl. 115—.5 A **18 Claims**



1. A marine vessel comprising a deck, a live turntable mounted on said deck in a fixed location and having support and positioning means for one front steering wheel of a motor vehicle, a dummy turntable positioned on said deck and laterally movable for selective positioning to support the other front steering wheel of said motor vehicle, a rudder, steering gear means connecting said live turntable and said rudder for turning the rudder in response to turning of said live turntable, retaining means freely movable to any location on the surface of said deck when unloaded for selective positioning on said deck to accommodate and when so loaded to secure one rear

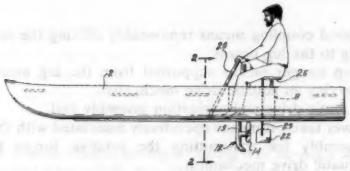
wheel of said vehicle against fore-and-aft movement, rotary drive means freely movable to any location on the surface of said deck when unloaded for selective positioning on said deck in juxtaposition with the other rear wheel of said vehicle so as to be rotated in response to turning of said other rear wheel when said other rear wheel is in driving relation thereto, a fluid pump connected to said rotary drive means to be turned thereby, a propeller, fluid motor means connected to said propeller for driving the propeller, and flexible coupling means connected to said fluid pump and to said fluid motor means for supplying fluid for driving said motor means in response to turning of said pump.

3,987,749

MOBILE PEDAL PROPULSION FOR SMALL BOATS

Axel J. Anderson, 5155 Langelier Blvd., Montreal H1M 2A3, Quebec, Canada

Filed Aug. 25, 1975, Ser. No. 607,827
Int. Cl.[2] B63H *16/12*
U.S. Cl. 115—25 1 Claim



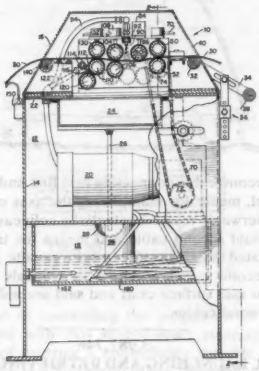
1. A pedal-propelled boat comprising a boat shell defining a bottom and sides, said bottom having an aperture, a closed perimeter wall forming a well open at both ends, upstanding from said bottom and having an outwardly directed bottom flange secured in fluid-tight relation to the edge of said aperture, and an inwardly directed bottom flange to form a rest for a pedal-operated propelling unit, said closed perimeter wall spaced from the sides of said boat shell and having a top edge at a higher level than the normal level of floatation of the boat shell, and a pedal-operated boat propelling unit removably fitted within said well, said unit including a watertight enclosure having a bottom wall resting on said bottom flange, side walls closely fitting said closed perimeter wall and a top wall higher than the top edge of said closed perimeter wall, a column secured to and projecting downwardly through said aperture from said enclosure bottom wall, an impeller rotatably carried by said column under said boat shell bottom, a crank shaft extending transversely through said enclosure and projecting through opposite side walls thereof and transversely of the boat shell and extending over the top edge of said closed perimeter wall beyond the latter into the spaces between said well and said boat shell sides, pedals carried by the ends of said crank shaft, and located in said spaces, gear means located in said enclosure and drivingly connecting said crank shaft and said impeller for rotating said impeller by rotating said crank shaft by means of said pedals, a rudder located under said enclosure bottom wall behind said impeller and secured to the lower end of a control rod rotatably journalled in said enclosure and extending upwardly through said enclosure above the same, a rudder control means secured to the upper end of said control rod, and a saddle carried by the top of said enclosure above the same in a position such that a person seated on the saddle has access to said pedals and to said rudder control means, said enclosure being removable from said boat shell as a unit including said saddle, said enclosure, said impeller and said rudder, said aperture being of a size sufficient to allow passage of said impeller and rudder therethrough.

3,987,750

FREE STANDING STRIP OILER AND FEEDER

David M. Knapke, Sidney, Ohio, assignor to Perfecto, Inc., Piqua, Ohio

Filed May 16, 1975, Ser. No. 578,142
Int. Cl.[2] B05C *1/08, 11/02, 5/00*
U.S. Cl. 118—5 9 Claims



1. A free standing strip oiler and feeder adapted to oil a strip on its upper and undersides and feed it to a press, said strip oiler and feeder comprising:

a base assembly,

power means associated with said base assembly,

a coacting pair of pinch rolls adapted to receive and feed the strip positioned between the coacting surfaces of said pinch rolls,

means connected to the power means for providing rotation to the pinch rolls,

means for depositing oil on the upper surface of the strip, said means being positioned on the output side of the pinch rolls,

a pair of squeegee rolls spaced from the oil depositing means and adapted to pass the strip between their coacting surfaces to smooth out the oil on the upper surface of the strip,

means for applying oil to the underside of the strip adjacent the output side of the squeegee rolls, said means comprising a pair of coacting rolls positioned beneath the strip passing through the squeegee rolls, one of said coacting rolls being a coating roll in contact with the underside of the strip, means for projecting oil into the nip of said coacting rolls whereby a coating of oil will be formed on the coating roll for application to the underside of the strip, and

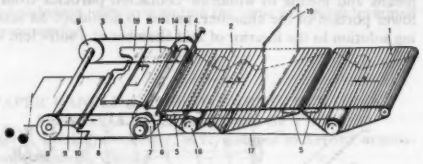
a back-up roll coacting with the coating roll at the point where the strip contacts said coating roll whereby the oil coating on the upper surface of the strip is finally smoothed to desired thickness, the pass line defined by the place where the back-up roll and coating roll meet being higher than the pass line formed by the contact of the pair of squeegee rolls whereby excess oil on the strip will drain away from the back-up and coating rolls.

3,987,751

APPARATUS FOR COATING CONFECTIONERY SUCH AS CHOCOLATES OR BISCUITS

Jean H. Delonnay, La petite Anesse, 45500 Gien, France

Filed Jan. 24, 1975, Ser. No. 544,013
Claims priority, application France, Jan. 31, 1974, 74.03202; Dec. 16, 1974, 74.41345
Int. Cl.² B05C 5/00
U.S. Cl. 118—24 2 Claims



1. Apparatus for coating confectionery such as chocolates or biscuits, comprising:

a feed device for receiving the confectionery to be coated and feeding the confectionery to a coating device wherein the confectionery is coated,

means for driving the feed device and the coating device in synchronism, and

means disposed immediately downstream of the coating device for receiving and discharging the coated confectionery and including a removable belt and drive chain for engaging and advancing the belt over a guide plate fitted adjacent the coating device and thence over a removable support plate whereby confectionery coated in the coating device is received on the advancing belt,

said guide plate having a normal working position and being secured to a longitudinally slidable means, mounted within a fixed frame and including pivotable support means, so as to be displaceable away from the coating device out of said working position, and

control means for temporarily displacing the guide plate away from the coating device during the passage of the leading end of the belt into a gap defined between the leading edge of the guide plate and the coating device,

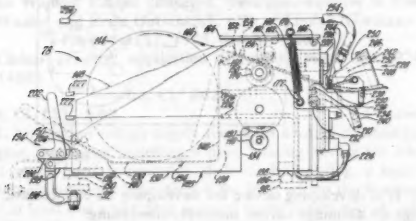
said control means including a cam, mounted upon said chain for driving said belt, which operatively engages said pivotable support means of said slidable guide plate means.

3,987,752

APPARATUS FOR DISPENSING ELONGATE FLEXIBLE MATERIAL

Ward B. Miller, Waterville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed May 5, 1975, Ser. No. 574,679
Int. Cl.² B05C 11/00, 1/06
U.S. Cl. 118—42 31 Claims



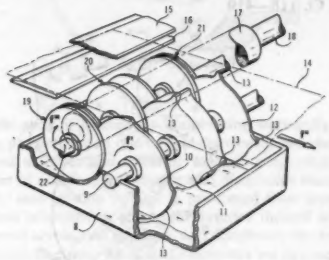
1. Apparatus for dispensing tape from any position along a given path which is transverse to the direction in which the tape is dispensed, said apparatus comprising a frame, an elongate drive member supported on said frame and having a length at least substantially equal to the length of the path, a tape dispenser housing supported on said frame at any point along the drive member, said housing having a driven member rotatably carried thereby and engagable with said elongate drive member at substantially any position therealong, and a tape drive roll driven by said driven member and positioned to engage and dispense tape from a supply thereof carried by said housing.

3,987,753

DEVICE FOR DEPOSITING CONTROLLED AMOUNTS OF ADHESIVE SUBSTANCES

Enzo Seragnoli, Bologna, Italy, assignor to G. D Societa Per Azioni, Italy

Filed July 2, 1974, Ser. No. 485,130
Claims priority, application Italy, Sept. 21, 1973, 3499/73
Int. Cl.² B05C 1/02
U.S. Cl. 118—212 6 Claims



1. Apparatus for rapidly and accurately transferring adhesive liquid to small predetermined areas on wrapping sheets, comprising:

a. an upwardly open tank receptive of a body of adhesive liquid and having means disposed above the body of liquid for guiding successive flexible sheets of wrapping material moving rapidly in a straight-lined direction in an elevated plane above the body of liquid to receive transferred adhesive liquid accurately on a small, predetermined area disposed on an underside surface of each moving sheet;

b. a rotatable transfer disk vertically disposed in the tank, normally partly immersed in the liquid, and having a profile portion radially outwardly extending to a small projecting edge portion of the disk for raising adhesive liquid on the small projecting edge portion to a position in said plane, at the top of the disk, to transfer the raised liquid toward registry with the small, predetermined area on each moving sheet, the disk having means for rotating it rapidly to move the small projecting edge portion along the elevated plane, with the moving sheet, in said position;

c. a dosing, wiping and scraping unit disposed in the tank between the liquid body and the elevated plane and comprising a dosing cylinder, wiper disks coaxial therewith, and a stationary scraper disposed in edgewise contact with the dosing cylinder and wiper disks for scraping adhesive liquid therefrom, the dosing cylinder being radially spaced a small distance from the transfer disk for controlling the thickness of the raised adhesive liquid by displacing portions thereof from the small projecting edge portion to sides of the profile portion adjacent thereto, and each wiper disk being coaxial with the dosing cylinder and movably disposed for surface contact of a side thereof with the respective profile portion adjacent to the projecting edge portion substantially throughout consecutive radii of said side, for wiping substantially all the displaced adhesive liquid from said profile portion back

into the body of liquid, means for rotating the dosing cylinder and the wiper disks to effect such displacing and wiping; and

d. back-up roller means disposed above the elevated plane opposite said position for rotary surface movement along with the moving flexible sheets of wrapping material to accurately guide the small predetermined area, disposed on the underside of each sheet, in said plane to keep said area in registry with the small projecting edge portion of the disk moving along said plane in said position.

3,987,754

APPARATUS FOR APPLYING FLUENT THERMOPLASTIC MATERIALS

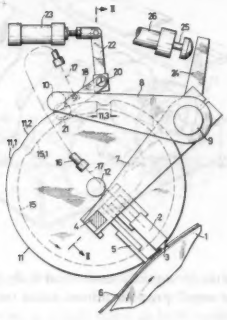
Fritz Achelpohl, Lengerich, Westphalia, Germany, assignor to Windmoller & Holscher, Lengerich, Westphalia, Germany

Filed Apr. 29, 1975, Ser. No. 572,868

Claims priority, application Germany, May 9, 1974, 2422528

Int. Cl.² B05C *5/02*

U.S. Cl. 118—410 **4 Claims**



1. Apparatus for applying adhesive to a moving article comprising a nozzle through an orifice of which the adhesive is applied as the article passes it, a first rotary cam and follower means for projecting the nozzle towards the article for application of adhesive and retracting it again, and valve means for opening and closing the nozzle orifice, wherein said first rotary cam is provided with a cam track comprising a first cam portion governing retraction of the nozzle, a second cam portion governing projection of the nozzle and a third cam portion disposed between said first and second cam portions for projecting the nozzle still further, control means being provided for opening said valve means when the nozzle is in the projected position governed by said second cam portion and closing said valve means during said still further projection of the nozzle.

3,987,755

IMPREGNATOR UNIT FOR CATALYST MANUFACTURE

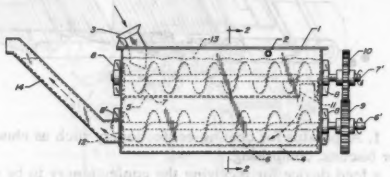
Michael S. Linn, Arlington Heights, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Feb. 18, 1975, Ser. No. 550,899

Int. Cl.² B05C *3/05*

U.S. Cl. 118—417 **1 Claim**

1. An impregnator unit for effecting the continuous movement of subdivided solid catalyst particles through an activating solution whereby to effect uniform and efficient mixing of said particles with said solution, which comprises in combination, an elongated solution holding chamber, a lower trough means and at least one upper trough means each of which extend longitudinally through said chamber, with one trough being superimposed above the other and passage means to transfer particles from one trough to the next lower trough within said chamber, a rotatable auger means positioned within each trough means to provide for the longitudinal movement of particles along each trough, the size of said solution holding chamber being not substantially larger than the length and width of said auger and trough means positioned in said chamber, whereby the volume of activating solution to be held in said chamber will be minimized and said solution is agitated by rotation of said auger means therein, power means for rotating said augers, means to charge particles to said chamber above the uppermost auger and trough means and means to withdraw contacted particles from the lower portion of the chamber, means to introduce an activating solution to the interior of said chamber at a sufficient level



to immerse said troughs and auger means therein, drive means in interconnection with each of said auger means to drive said respective auger means in opposite directions to each other to thereby reverse the direction of movement of said catalyst particles as said particles move through said unit from said upper trough means to said lower trough means, an inclined discharge conduit interconnected with said lower trough means terminating at a level above said level of said activating solution, and auxiliary power means in interconnection with said discharge conduit to provide a positive lifting and moving of said particles to the outlet end of said discharge conduit, whereby said inclined discharge conduit provides for maintaining the liquid at said sufficient level.

3,987,756

DEVELOPING DEVICE

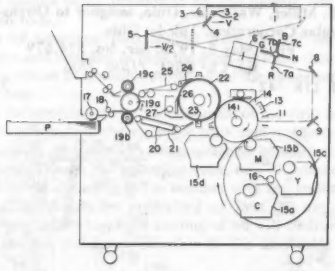
Hajime Katayama, Tokyo; Akiyoshi Torigai, Machida, and Shigeyoshi Onoda, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 2, 1975, Ser. No. 564,299

Claims priority, application Japan, July 19, 1974, 49-82979; July 27, 1974, 49-86381; July 27, 1974, 49-86383

Int. Cl.² G03G *15/08*

U.S. Cl. 118—637 **12 Claims**



1. A developing device for developing an electrostatic image on an image carrier member, comprising:

a plurality of developing units for supplying predetermined color developers;

support means having a movable support member for revolvably supporting each of said developing units and for

moving each of said developing units along a common circumference;

drive means for imparting a drive to said support means;

velocity control means for transmitting the drive of said drive means to said support means so as to gradually accelerate said movable support member of said support means from a rest position and gradually decelerate said movable support member to reach a next rest position; and

orientation regulating means connected to each of said developing units to maintain the same in a predetermined orientation.

3,987,757

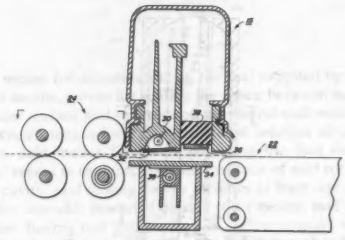
PAPER HANDLING IMPROVEMENTS IN RADIANT FUSER VIA CORRUGATION OF PAPER

Walter F. Leising, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 18, 1974, Ser. No. 524,429

Int. Cl.² G03G *15/20*

U.S. Cl. 118—641 **6 Claims**



1. Apparatus for fusing toner images to support members through the utilization of thermal energy, said apparatus comprising:

oppositely disposed sources of radiant energy forming a toner image fuser having an inlet and outlet;

first transport means disposed outside of said toner image fuser and adjacent said inlet for controlling movement of approximately the first half of a support member intermediate said radiant sources without contacting said sources; and

second transport means diposed outside of said toner fuser and adjacent said outlet and cooperating with said first transport to complete movement of said support member through said fuser without touching of said sources by said support member and the toner images carried thereby.

3,987,758

RADIAL PISTON ENGINE

Felix Wankel, Lindau (Bayern), Germany, assignor to Felix Wankel and Ernst Hutzenlaub, both of Lindau, Germany

Filed Mar. 21, 1975, Ser. No. 560,457

Claims priority, application Germany, Mar. 26, 1974, 2414589

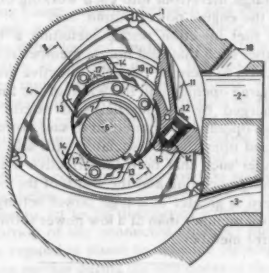
Int. Cl.² F02B *53/12*

U.S. Cl. 123—8.09 **4 Claims**

1. An ignition voltage supply system for a rotary combustion engine, the engine including a fixed housing having gas inlet and outlet ports, a rotatable shaft in the housing, a rotary piston eccentrically mounted on the shaft within the housing, and at least one spark plug secured in the rotary piston, said ignition voltage supply system comprising:

a distributor electrode mounted in an insulated distributor member secured to the eccentric of the shaft, said distributor electrode being electrically connected with a power source and extending to a surface portion of said distributor member;

at least one feed electrode mounted in an insulated feed member, said feed member being secured to said piston and being electrically connected to said at least one spark plug, said feed electrode extending to a surface of said feed member to be directly opposed to and spaced from said distributor electrode once during each rotation of the shaft; and



a labyrinth air gap formed by cooperating outwardly extending projections on one of said distributor member or said feed member and inwardly extending openings on the other of said feed member or said distributor member whereby said ignition voltage is prevented from passing along said labyrinth air gap to the exterior thereof and is transferred across said gap from said distributor electrode to said feed electrode when said electrodes are opposed.

3,987,759

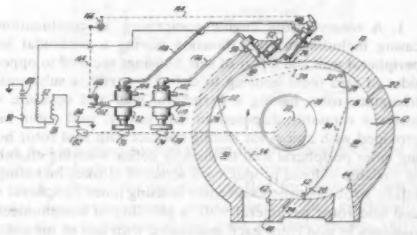
STRATIFIED CHARGE ROTARY ENGINE WITH VARIABLE SPRAY ANGLE FUEL NOZZLE

Thomas C. Roberts, Ridgewood; Charles Jones, Hillsdale; Harold D. Lamping, Oakland, and David M. Myers, Upper Saddle River, all of N.J., assignors to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed June 3, 1975, Ser. No. 583,478

Int. Cl.² F02B *53/10*

U.S. Cl. 123—8.09 **6 Claims**



1. A rotary combustion engine comprising:

a. an outer body having an internal cavity, the peripheral surface of which has a multilobe profile, said body also having an air intake passage and a combustion gas exhaust passage with said air intake passage being characterized by the absence of any throttle valve;

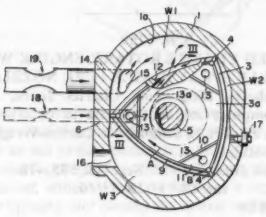
b. an inner body of generally polygonal profile mounted for relative rotation within said outer body having sealing cooperation with said peripheral surface to define a plurality of working chambers which vary in volume in response to said relative rotation;

c. a fuel injection nozzle mounted on said outer body and having a nozzle discharge opening for discharging fuel into each working chamber after the air charge in said chamber has been substantially compressed;
d. pump means for supplying fuel to said nozzle for discharge therefrom into each working chamber;
e. means for initiating combustion of the fuel discharged by said nozzle promptly as it enters each working chamber;
f. a power control member movable for varying the quantity of fuel supplied by said pump means to said nozzle for discharge therefrom into each working chamber so as to vary the engine power output; and
g. said fuel injection nozzle including a movable nozzle member such that said nozzle member is movable in one direction to increase both the effective area of the nozzle discharge opening and the width of the fuel spray pattern discharged by the nozzle, said nozzle also including means operatively connected to said power control member and operatively associated with said movable nozzle member such that both the effective area of the nozzle discharge opening and the width of the nozzle fuel spray pattern is greater at a high power setting of said power control member than at a low power setting of said power control member.

3,987,760
ROTARY PISTON TYPE ENGINE

Masaharu Kanaoka, Hiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Japan

Filed July 3, 1974, Ser. No. 485,545
Claims priority, application Japan, July 7, 1973, 48-76741; July 7, 1973, 48-76740
Int. Cl.² F02B *53/10*
U.S. Cl. 123—8.13 **16 Claims**

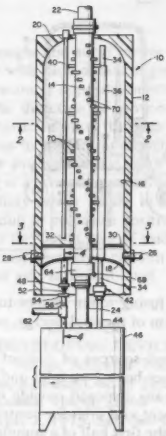


1. A rotary piston engine comprising, in combination, a casing including a rotor housing having a trichoidal inner peripheral wall and a pair of side housings secured to opposite sides of said rotor housing to define a cavity, a substantially triangular rotor having a peripheral wall and opposite side surfaces rotatably disposed in said cavity, said rotor being provided with apices for sliding contact with said rotor housing inner peripheral wall to thereby define working chambers of variable volume producing a series of strokes including an intake stroke between said rotor housing inner peripheral wall and said rotor peripheral wall, a plurality of communication passages in said rotor each associated with one of the areas of said rotor peripheral wall between said apices, and having one end opening into the leading portion of the associated area of the rotor peripheral wall in the direction of the rotation of the rotor, the other ends of said communication passages each opening into one of said rotor side surfaces, first intake port means in one of said side housings in continuously covered relationship with the adjacent side surface of said rotor, means for supplying a rich air-fuel mixture to said first intake port means, second intake port means provided in one of said side and rotor housings for communicating with the working chambers producing said intake stroke, means for supplying a combustion supporting medium to said second intake port means, each of said other ends of said communication passages being arranged to sequentially and cyclically communicate with said first intake port means during the rotation of said rotor and during the intake stroke of the working chamber defined by the area of said rotor peripheral wall containing said one end of said communication passage in communication with said first intake port means to introduce a rich air-fuel mixture into said working chamber during said intake stroke, said second intake port means being arranged to communicate with said working chamber during said intake stroke to thereby also supply said working chamber with a combustion supporting medium, and ignition means on said casing for igniting the fuel in said casing.

3,987,761
AUXILIARY HEATER FOR A GAS-FIRED WATER HEATER

Gordon L. Downs, 2607 Emerald St., and Woodrow W. Mecham, 632 Delfino Lane, both of Bakersfield, Calif. 93304

Continuation-in-part of Ser. No. 514,568, Oct. 15, 1974, abandoned. This application Mar. 12, 1975, Ser. No. 557,772
Int. Cl.² F22B *33/10*
U.S. Cl. 122—20 B **8 Claims**



1. In combination with a water heater tank having a heating means which produces heated gases which pass through a flue into the ambient, said water heater tank having a water inlet and a water outlet, an auxiliary heater comprising:
a tank having a top and a bottom and having an interior water chamber, said tank having a tank wall, said wall including opening means provided therein, said opening means connecting with said flue at said bottom and also connecting with an outlet flue pipe at said top, whereby the gases from said flue pass into said opening means at the bottom of said tank and then pass completely around said tank wall and hence into said outlet flue pipe at said top; and
means for collecting condensate from said tank wall preventing such from entering said flue.

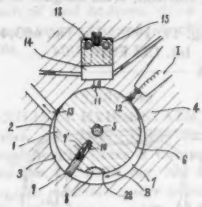
3,987,762
ROTARY ENGINE

Ryosaku Sawada, Nishinomiya, Japan, assignor to Kabushiki Kaisha Hanshin Gijutsu Kenkyusho, Japan

Filed Apr. 1, 1974, Ser. No. 456,956
Int. Cl.² F02B *53/04*
U.S. Cl. 123—8.13 **18 Claims**

1. A rotary engine comprising: a casing, a combustion chamber formed in said casing, a rotor means having a circular outer surface disposed in said combustion chamber, said combustion chamber including at least one peripheral wall portion equal to the circumference of said circular outer

surface of said rotor means and at least one second peripheral wall portion greater than the circumference of said circular outer surface of said rotor means, fuel intake means disposed in said first peripheral wall portion for supplying fuel to the engine, ignition means spaced from said fuel intake means and disposed in said first peripheral wall portion, exhaust means disposed in said second peripheral wall portion for exhausting combustion gases from the engine, means for rotatably mounting said rotor means in said combustion chamber to permit said circular outer surface of said rotor means to be in sliding hermetic contact over a predetermined length of said first peripheral wall portion and spaced from said second peripheral wall portion, means on said circular outer surface of said



rotor means for accommodating the fuel supplied by said fuel intake means, means for sealing the space between said circular outer surface and said second peripheral wall portion from the exhaust means for a predetermined rotation of said rotor means, said means for accommodating the fuel includes a partial recess in said circular outer surface of said rotor defining a cavity, said sealing means includes at least one partition member movably mounted on said rotor means, said partition member having one end portion in sliding contact with said peripheral wall portions of said combustion chamber, said partition means is movably mounted on said rotor means forwardly of said cavity in the direction of rotation of said rotor means and means on said rotor for diluting the fuel supplied to the engine.

3,987,763

ROTARY ENGINE COMBUSTION ARRANGEMENT

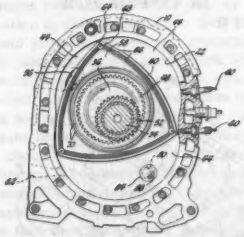
Edward D. Klomp, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 21, 1975, Ser. No. 570,172

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² F02B *53/00*

U.S. Cl. 123—8.45 **3 Claims**



1. A rotary combustion engine comprising housing means having an inner peripheral wall and oppositely facing side walls, a rotor rotatably mounted in said housing means between said side walls with apexes that remain adjacent said peripheral wall as said rotor rotates, said rotor and said walls cooperatively providing a plurality of chambers spaced around said rotor that expand and contract while moving with said rotor, said housing means having an intake port openable by said rotor for delivering a combustible gaseous mixture to said chambers as they expand in an intake phase prior to contracting in a compression phase, ignition means for igniting the mixture in said chambers following their compression phase to cause their expansion in an expansion phase, said housing means having an exhaust port openable by said rotor for receiving exhaust gases from said chambers as they contract in an exhaust phase, said housing means further having a plenum, and a nozzle in one of said walls openable by said rotor for providing communication between said plenum and said chambers only as they expand during their expansion phase, said nozzle being located relative to said rotor so that said communication is initiated during the gas expansion process but after rapid combustion is complete when the pressure in said plenum is relatively low whereby on establishing said communication said plenum is charged with relatively high-pressure hot gaseous products of combustion from the connected chamber until plenum and chamber pressure are equal and thereafter on continued rotor rotation and lowering chamber pressure below plenum pressure there is caused a relatively hot gaseous jet to be discharged from said nozzle into a trailing portion of the connected chamber during the remainder of the expansion phase to enhance burning of the gases in the trailing portion during the remainder of the expansion phase and into the exhaust phase.

3,987,764

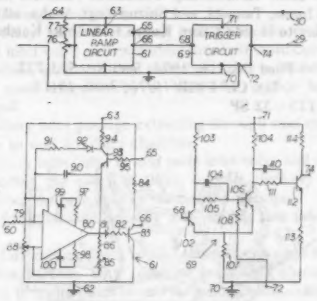
TIMER MEANS FOR SEQUENTIAL FUEL INJECTION

Bruce A. Scofield, Fort Wayne, Ind., assignor to International Harvester Company, Chicago, Ill.

Continuation of Ser. No. 517,974, Oct. 25, 1974, abandoned, which is a continuation of Ser. No. 265,004, June 21, 1972, abandoned. This application July 11, 1975, Ser. No. 596,025

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 EA **6 Claims**



1. A fuel injection control system for an engine including a plurality of cylinders and fuel injection valve means associated with each cylinder for injection of fuel for flow into each cylinder during the intake stroke thereof and electrically energizable actuator means for each of said injector valve means, said control system comprising: first and second control voltage means for supplying first and second control voltages, one of said first and second control voltages being responsive to engine speed and the other of said first and second control voltages being responsive to engine intake manifold pressure, means for supplying timer triggering signals in predetermined phase relation to intake strokes of the engine, timer means comprising a timer circuit, controlled by said control voltages and controlled in response to one of said triggering signals to develop an output signal after a time interval having a duration varying as a linear function of the magnitude of each of said control voltages, and means cou-

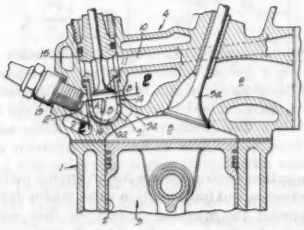
pled to one of said actuator means and arranged for operating in predetermined phase relation to said one of said triggering signals to effect opening of one of said injector valve means and for operating in response to said timer output signal to effect closing of said one of said injector valve means, said timer circuit including a ground terminal at a reference potential, capacitance means having a first terminal connected to said ground terminal and having a second terminal, a regulated voltage source having a first terminal connected to said ground terminal and having a second terminal maintained at a fixed potential relative to said ground terminal, transistor means connected between said second terminal of said capacitance means and said second terminal of said regulated voltage source, means connecting said transistor means to said timer triggering signal supplying means for rendering said transistor conductive in response to one of said triggering signals to fix the voltage between said first and second terminals of said capacitor means at a value substantially equal to said fixed potential, capacitor charge control means having first and second terminals respectively connected to said ground terminal and said second terminal of said capacitor means and having an input line connected to said first control voltage means, said capacitor charge control means including a controllable current sink operative to discharge said capacitor means at a linear rate controlled by the first control voltage applied between said input line and said ground terminal, and a trigger circuit having a first input connected through an input line to said second control voltage means and having a second input connected to said second terminal of said capacitor means, said trigger circuit being triggered from one state to another to develop said output signal when the potential of said second input thereof drops below the potential of said first input thereof.

3,987,765

RESIDUAL GAS CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINES HAVING AUXILIARY COMBUSTION CHAMBERS

Yasuhito Sato, Kamifuoka; Yoshitoshi Sakurai, Kawasaki; Kazuo Inoue, Tanashi, and Shizuo Yagi, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1974, Ser. No. 533,222
Int. Cl.[2] F02B *19/10, 3/00, 19/18*
U.S. Cl. 123—32 SP **6 Claims**



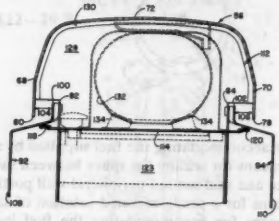
1. Residual gas control apparatus for a four cycle internal combustion piston engine having a main combustion chamber and an auxiliary combustion chamber connected by torch passage means, a valve controlled main intake passage for delivering a lean mixture to the main combustion chamber, and a valve controlled auxiliary intake passage for delivering a rich mixture to the auxiliary combustion chamber, operation of the engine causing entrapment of burned residual gas in the auxiliary chamber at the end of each exhaust stroke, the improvement comprising, in combustion: an ignitor adjacent the auxiliary combustion chamber, means dividing the auxiliary combustion chamber into a first zone confronting the ignitor and a second zone confronting the torch passage means, and port means communicating between the zones, the zones being so proportioned and the port means being so arranged as to produce a readily ignitable rich mixture diluted by residual gas in the first zone, and a less diluted rich mixture in the second zone, the port means providing controlled ignition progress from the first zone to the second zone and through the torch passage means into the main combustion chamber, said port means including a first port disposed adjacent the auxiliary intake valve and a second port remote therefrom.

3,987,766

ENGINE ENCLOSURE AND HEAT DEFLECTOR ARRANGEMENT

Arnold Emil Welck, Horicon, Wis., assignor to Deere & Company, Moline, Ill.

Filed Aug. 11, 1975, Ser. No. 603,446
Int. Cl.[2] F01P *7/04*
U.S. Cl. 123—41.66 **7 Claims**



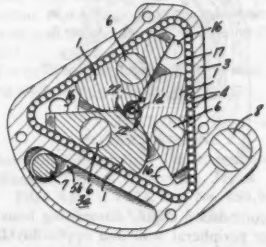
1. In a combination of an air cooled engine having a heat shroud forming an integral part thereof and including a top wall provided with an intake opening and an open bottom, whereby air will flow from top to bottom through the shroud and an engine enclosure defined by a hood extending over the engine and opposite side panels disposed on opposite sides of the engine, the improvement comprising: the hood and side panels including respective lower and upper portions cooperating to define air inlet opening means at the opposite sides of the engine at a level above the top wall of the heat shroud; and a heat deflector means extending between the shroud and the enclosure in such relationship to the intake opening that flow to the latter from respective areas between the engine and the side walls and a front portion of the hood is prevented.

3,987,767

EXPANSIBLE CHAMBER DEVICE

Norman L. Buske, Saunderstown, R.I., assignor to Quadratics Inc., Wickford, R.I.

Filed Feb. 15, 1974, Ser. No. 443,121
Int. Cl.[2] F02B *25/08*
U.S. Cl. 123—51 R **28 Claims**



1. An expansible chamber device comprising a housing including two parallel end plates spaced from one another and a plurality of like hedrons disposed between said end plates.

the number of said hedrons being not less than three and not more than six, each of said hedrons having opposite end faces engaging said end plates respectively, an inner face extending between said end faces and a sealing face extending between said end faces and disposed at an angle relative to said inner face, said sealing face of each hedron engaging the inner face of the next adjacent hedron to define a single working chamber bounded by said end plates and the inner faces of said hedrons, means supporting and guiding each of said hedrons for like translatory movement along a rectilinear path to vary the volume of said working chamber while maintaining the sealing faces of said hedrons in engagement with the inner faces of adjacent hedrons, means for synchronizing the movement of said hedrons, means connecting said synchronizing means with each of said hedrons, drive means, and power transmitting means connecting said synchronizing means with said drive means.

3,987,768

VEHICLE AUXILIARY HYDROSTATIC DRIVE SYSTEM

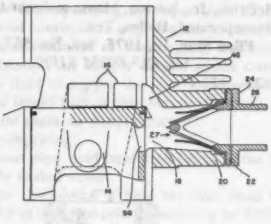
Billie Gene Hunck, and James Henry Kress, both of Cedar Falls, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jan. 14, 1974, Ser. No. 433,094

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² B60K *17/30*

U.S. Cl. 180—49 **4 Claims**



1. A vehicle having an engine, a pair of main drive wheels, variable ratio transmission means for transmitting driving torque from the engine to the main drive wheels, a pair of steerable wheels, and an auxiliary hydrostatic drive system for the steerable wheels including a fluid pump, a reservoir providing a supply of fluid for the pump, at least one reversible reciprocating piston type motor drivingly connected to the steerable wheels, said motor having first and second ports and a drive chamber port, first fluid line means interconnecting the pump and reservoir with the first and second ports in the motor, and motor control valve means interposed in the first fluid line means movable to either side of a neutral, fluid blocking position to deliver fluid from the pump to either the first or second ports in the motor, characterized in that a second valve has first and second sides, second fluid line means connects the drive chamber port with the first side of the second valve, additional fluid line means interconnects the reservoir, the second side of the three-way valve and the first fluid line means between the motor and motor control valve means, first check valve means are interposed in the additional fluid line means to prevent flow of fluid from the first fluid line means to the additional fluid line means, further fluid line means separate from the additional fluid line means interconnects the first fluid line means between the motor and motor control valve means with the second side of the three-way valve, second check valve means are interposed in the further fluid line means to prevent flow of fluid from the further fluid line means to the first fluid line means, and the three-way valve is movable between a first neutral position in which it interconnects the further fluid line means with the second fluid line means to destroke the motor and at least one additional position in which it interconnects the additional fluid line means with the second fluid line means to vent the drive chamber port to the reservoir.

3,987,769

JET IGNITION ENGINE WITH VALVE-CARRIED IGNITION CHAMBER

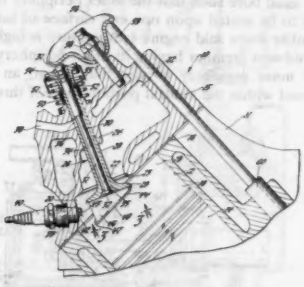
Ming-Chih Yew, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 31, 1975, Ser. No. 563,780

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² F02B *75/02*

U.S. Cl. 123—75 B **8 Claims**



1. An internal combustion engine comprising

means defining a variable volume main combustion chamber,

a main inlet port to said chamber

a main inlet valve closing said inlet port and operable to permit the entry of fluids to said main combustion chamber through said port,

an auxiliary ignition chamber formed on the end of said main inlet valve and extending into said main combustion chamber, said auxiliary chamber being connected with said main chamber by at least one orifice in a wall thereof,

an auxiliary inlet passage extending through said main inlet valve to said auxiliary chamber,

an auxiliary inlet valve in said main inlet valve and operable to permit the entry of fluids to said auxiliary ignition chamber through said auxiliary inlet passage,

means for cyclically opening and closing said inlet valves and

means for igniting fluids in said ignition chamber for combustion therein, with resulting expansion through said orifice to ignite fluids in said main combustion chamber.

3,987,770

HEAT RESPONSIVE PNEUMATIC IGNITION TIMING CONTROL DEVICE

Isshi Nomura, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed Sept. 20, 1974, Ser. No. 507,801

Claims priority, application Japan, Sept. 21, 1973, 48-107177; Sept. 21, 1973, 48-107178

Int. Cl.² F02P *5/04*

U.S. Cl. 123—117 A **6 Claims**

1. An ignition timing control device for an internal combustion engine comprising:

a body;

means defining an axial bore provided within said body;

first, second and third ports provided within said body communicating with said axial bore, said third port being positioned between said first and second ports;

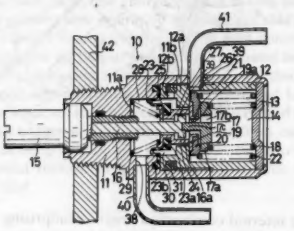
rod means movable in said axial bore from said first port side to said second port side according to the increase of the engine temperature;

a first seat member radially projecting from the inner wall of said means defining said axial bore and located between said second port and said third port;

a valve member having an axially penetrating bore in which said rod means is loosely mounted, said bore being formed within a central portion thereof, and said valve member being adapted to contact said seat member at its outer end surface, and being located between said seat member and said second port;

a diaphragm having its outer periphery interposed between said first port and said third port and fixed with said inner wall of said axial bore, and being axially movable within said axial bore such that the inner periphery floats and is able to be seated upon one end surface of said first seat member when said engine temperature is high;

a second seat member having its outer periphery fixed with said inner periphery of said diaphragm, an axial bore formed within the central portion thereof through which



said rod means is loosely mounted, and also having one end surface in contact with said valve member when said engine temperature is low or intermediate;

a first spring always biasing said valve member toward said third port side;

a second spring always biasing said second seat member toward said second port side, said second spring being weaker than said first spring;

a third spring always biasing said rod toward said first port side;

said rod having seat surface means for closing the axial bore of said valve member when said engine temperature is intermediate or high, and for biasing said valve members toward said second port side against the force of said first spring, and a surface engaging said third spring,

whereby when said engine temperature is low or high, communication between said second and third ports is closed and communication between said first and second ports is opened, and when said engine temperature is intermediate, communication between said first and second ports is closed and communication between said second and third ports is opened.

3,987,771

FUEL AND AIR INJECTION DEVICE

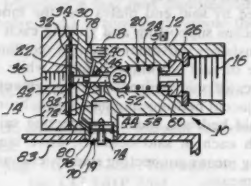
Cecil David Oglesby, Manchester, Mo., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 1, 1975, Ser. No. 601,693

Int. Cl.² F02M *7/00*

U.S. Cl. 123—119 R **4 Claims**

4. A distributing and dividing element adapted for use in a fuel metering mechanism; said element constructed to be placed in a chamber in a fuel path; said element having an outer annular hollow section, a conical surface disposed in said fuel path, a central hollow tubular portion extending in the direction of the fuel path, and a series of hollow radial spokes connecting said annular section and said tubular portion; the annular surface adapted to closely fit the interior wall of said chamber; means in said wall supplying air to the interior of said annular section and thereby to said tubular portion whereby said conical surface will disperse the fuel flowing in



said path into fine particles which are mixed with the air being admitted through said tubular portion whereby a proper mixture is produced for supply to combustion chambers of an internal combustion engine.

3,987,772

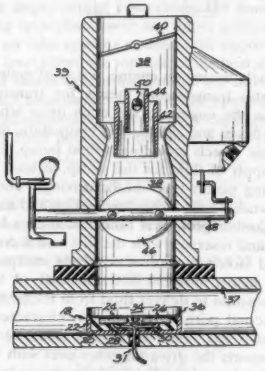
SELF-REGULATING HEATER

Lyle E. McBride, Jr., Norton, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 10, 1975, Ser. No. 557,142

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 F **11 Claims**



1. In fuel entry system of an internal combustion engine wherein the improvement comprises a carburetor having a barrel through which fuel is adapted to pass, a stove disposed in the intake manifold in alignment with said barrel, the stove comprising a self-regulating heater element having a steeply sloped positive temperature coefficient of resistivity, and means to electrically connect the element to a power supply so that shortly after energization thereof the element is maintained at an essentially constant pre-selected temperature whereby fuel droplets coming in contact with the stove will be vaporized to enhance start-up operation of the internal combustion engine.

3,987,773

LIQUID FUEL VAPORIZING DEVICE FOR INTERNAL COMBUSTION ENGINES

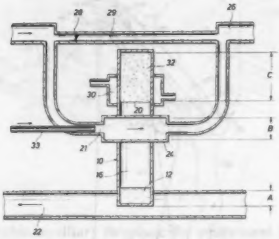
Geoffrey A. Harrow, Wirral; Walter D. Mills, Mold, both of England; John L. Wilson, East Kilbride, Glasgow, and Ian C. Finlay, Newton Mearns, Glasgow, both of Scotland, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 461,180, April 15, 1974. This application Sept. 29, 1975, Ser. No. 617,899

Claims priority, application United Kingdom, Apr. 19, 1973, 18888/73

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 AA 4 Claims



1. In a device for vaporizing the liquid fuel charge in the inlet of an internal combustion engine prior to its introduction into a combustion chamber of said engine, said inlet system including combustion air supply means which comprises: a main air supply duct to supply the main portion of the combustion air, and liquid fuel supply means disposed to supply liquid fuel to said main air supply duct;

said device comprising;

at least one heat pipe, said heat pipe being in the form of a substantially sealed vessel;

said heat pipe containing a heat transfer fluid having a boiling point at atmospheric pressure up to 400° C;

said heat pipe being disposed so that a liquid phase of the heat transfer fluid accepts heat in a heat receiving zone adapted to contact hot exhaust gases from said engine, and a vapor phase of the fluid being disposed to condense in the heat discharging zone; the improvement comprising that said heat discharging zone is disposed in heat transfer relation with said main air supply duct to heat said liquid fuel charge which has been mixed with at least the main portion of the combustion air and the heat pipe contains additional cooling means in the upper part of the heat pipe which are cooled with the aid of the cooling system of the engine.

3,987,774

SUPPLEMENTARY FUEL INJECTION APPARATUS FOR THE INTERNAL COMBUSTION ENGINE

Norman E. Waag, 3110 Broadview Road, Cleveland, Ohio 44109

Filed Nov. 26, 1975, Ser. No. 635,617

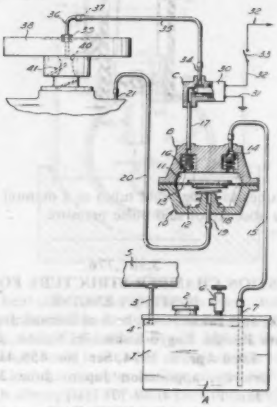
Int. Cl.² F02D *19/06, 39/00*

U.S. Cl. 123—139 AJ 6 Claims

1. A supplementary fuel injection apparatus for an internal combustion engine comprising:

a. a pressure type fuel reservoir member mounted adjacent the carburetor of the combustion engine and having therein a fuel receiving opening and fuel passage outlet, an exhaust gas passage tube from the engine exhaust manifold connected thereto, and exhaust gas pressure control means mounted thereon,

b. a diaphragm fuel pump and metering regulator member, a chambered housing therefor and having therein a fuel chamber and a vacuum chamber, an elastomeric non-corrosive pressure action fuel pump diaphragm mounted in said housing between said fuel and vacuum chambers and forming a common wall for said chambers and fuel pump means therefor, and said fuel chamber having a fuel metering inlet and outlet control means mounted in ports in the housing wall thereof, said inlet means port having a fuel passage inlet tube mounted therein and connected to said reservoir fuel passage outlet, the said vacuum chamber having a diaphragm pump action control means mounted therein and a vacuum passage tube having one end mounted therein and the other end connected to the engine intake manifold to supply a less than air pressure vacuum power to actuate the said fuel pump diaphragm, and



c. a fuel passage distribution member having a first fuel passage tube connected to said housing fuel outlet port, a fuel passage flow control means connected to said first fuel passage tube and mounted thereon, a fuel nozzle mounted on the engine carburetor adjacent the venturi thereof, a variable fuel pressure metering means connected to said fuel nozzle and a second fuel passage tube connected to said fuel passage flow control means and extending to a connection with said fuel nozzle, whereby said fuel passage distribution member provides a fuel passage for supplementary fuel from said housing of the diaphragm fuel pump and metering regulator member to the engine carburetor for the injection of said fuel into the carburetor venturi and for mixture with regular engine fuel brought thereto.

3,987,775

SQUEEZE-TUBE PRIMER FOR INTERNAL COMBUSTION ENGINES

Alton J. O'Connor, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Filed Apr. 16, 1975, Ser. No. 568,626

Int. Cl.² F02M *1/16*

U.S. Cl. 123—187.5 R 5 Claims

1. A combination primer and pump which comprises:

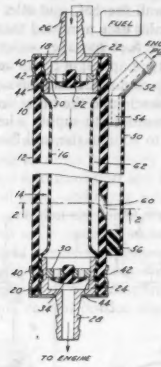
a. a pair of unsheathed, elongate concentric pliant tubes, the outer tube having a stiffer wall than the inner tube,

b. a closure at each end of said tubes having passages serving as inlet and outlet, respectively, to be connected to a fuel supply and an engine,

c. a unidirectional valve in each of said closures, and

d. means forming a passage associated with said outer tube to conduct a pulse pressure from an engine to a space between said tubes to cause said inner tubes to deflate and inflate sequentially to serve as a pump, said passage

means and said tubes being collapsible by the application of manual pressure for the purpose of manually pulsing



said tubes to utilize said tubes as a manual primer pump in the absence of said pulse pressure.

3,987,776

COMBUSTION CHAMBER STRUCTURE FOR A SPARK IGNITION ENGINE

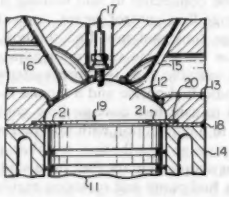
Kenji Goto, and Takao Niwa, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Apr. 5, 1974, Ser. No. 458,418

Claims priority, application Japan, June 21, 1973, 48-72735[U]; Jan. 17, 1974, 49-7717[U]

Int. Cl.² F02B *23/10*

U.S. Cl. 123—191 R **17 Claims**



1. A spark ignition, four-stroke cycle, internal combustion engine of the type that includes a cylinder block with at least one cylinder, a piston in the cylinder reciprocable through a predetermined stroke volume, a cylinder head formed with a single-chamber combustion space opening into the stroke volume of the cylinder and an intake port equipped with a poppet-type intake valve opening directly into the chamber, and means for supplying a stratified charge of air and carbureted fuel-rich mixture in sequence through the intake port during the intake stroke of the piston, but the configuration of the passageway formed by the intake port, the poppet-type intake valve and the single-chamber combustion space being such that the velocity of the charge entering the stroke volume of the cylinder is higher adjacent to at least a portion of the circumferential wall of the cylinder than it is in the rest of the cylinder, thereby causing undesirable mixing of the stratified charge, wherein the improvement comprises:

a peripheral barrier located near the opening from the combustion chamber into the stroke volume of the cylinder and projecting inwardly from at least the portion of the circumferential wall of the cylinder in the way of the higher velocity portion of the incoming charge in order to create approximately uniform velocity of the incoming charge at all points on a plane normal to the direction of flow past the barrier.

3,987,777

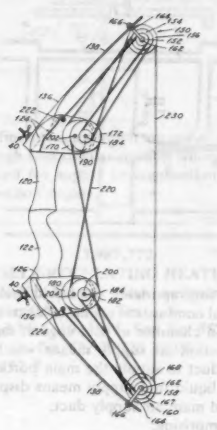
FORCE MULTIPLYING TYPE ARCHERY BOW

Rex F. Darlington, 3540 Darton Road, Hale, Mich. 48739

Filed Feb. 10, 1975, Ser. No. 548,206

Int. Cl.² F41B *5/00*

U.S. Cl. 124—23 R **4 Claims**



1. In a shooting bow having a handle portion and flexing limbs extending outwardly from the handle portion, that improvement which comprises:

a. a bowstring anchor point adjacent each end of the handle portion,

b. a first pulley means mounted to rotate eccentrically on a first axis on each end of said handle portion adjacent the proximal ends of said flexing limbs to support a portion of a bowstring,

c. a second pulley means mounted substantially at the free end of each limb of the bow to support another portion of a bowstring,

d. a bowstring having each end anchored at said respective anchor points and having a midsection nock stretch extending uninterruptingly between said second pulley means at said free ends of said limb portions, and spanning uninterruptingly between said anchor point and said second pulley means, the portions of said bowstring between said midsection and said ends being threaded over said first and second pulley means to cause said first eccentrically mounted pulley means to rotate and to revolve around said first axis to a point in the drawing of said bowstring wherein the mechanical advantage increases to assist in the retention of the string in the draw position,

e. a secondary pulley concentrically mounted on an axis common to that of first pulley means,

f. said second pulley means comprises a plurality of pulleys all mounted on a common axis,

g. said first pulley being belted by a run of said bowstring to a pulley in said second pulley means at the same end of the bow by a portion of said bowstring, and

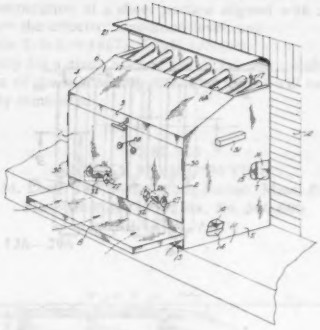
h. said secondary pulley being belted by a run of which extend from a pulley in the second pulley means to the secondary pulley and then to another pulley in the same second pulley means at the same end of the bow.

3,987,778

AUXILIARY FIREPLACE STRUCTURE

Michael D. Brik, 5105 SW. Cherry, Beaverton, Oreg. 97005

Filed Jan. 8, 1976, Ser. No. 647,581
Int. Cl.² F24B *13/00*
U.S. Cl. 126—121 3 Claims



1. A portable auxiliary fireplace for placement in front of a room wall opening, said portable auxiliary fireplace comprising,

a walled structure including a front wall, side walls, a back wall and an upper wall of metal construction,

horizontal and upright partitions within said structure partially defining a firebox on one side and horizontal and upright air passageways on their opposite sides through which a heated flow of air moves,

a series of inclined tubular ducts extending upwardly and rearwardly from said upright partition across said upright passageway and through said back wall for discharge of combustion products into the wall opening, and

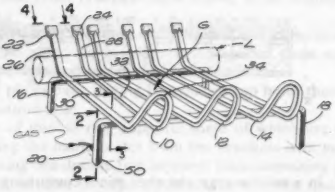
said side walls, front wall and upper wall serving as heat radiating surfaces for heating of the room while said inclined ducts additionally heat air flowing through said passageways.

3,987,779

FIREPLACE GRATE

Jack F. Richardson, 6814 N. Marcile Ave., Glendora, Calif. 91740

Filed Apr. 22, 1975, Ser. No. 570,541
Int. Cl.² F23H *3/04*
U.S. Cl. 126—165 4 Claims



1. A fireplace grate structure for supporting logs or the like, incorporating a gas burner, comprising:

at least a pair of metal support rails of tubular metal, whereby at least one of which rails defines a passage for combustible gas and further defines a plurality of spaced-apart burner gas jets;

a coupling means affixed to said one support rail for supplying gas to said passage in said one support rail;

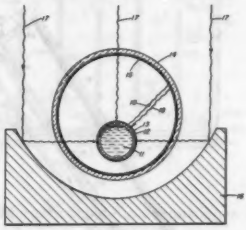
a plurality of tubular metal cradle members of U-shaped configuration the terminal ends being somewhat closed in a flat configuration, said members being affixed to extend between said rails for supporting said logs with said terminal ends exterior of one of said rails and said U-shaped sections exterior of the other of said rails.

3,987,780

GREENHOUSE WINDOW FOR SOLAR HEAT ABSORBING SYSTEMS DERIVED FROM CD_2SNO_4

Arthur Jack Nozik, Westport, and Gottfried Haacke, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 3, 1975, Ser. No. 554,370
Int. Cl.² F25J *3/02*
U.S. Cl. 126—271 1 Claim



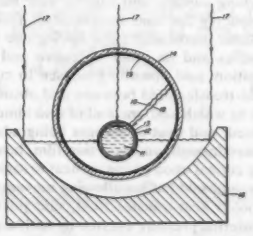
1. A solar heat collector comprising an evacuated glass pipe having a layer of cadmium stannate with the properties of high transmittance for solar radiation and high reflectance for thermal radiation on its inner wall, said glass pipe surrounding a steel pipe which has its outer surface coated with a material having a high absorptivity for solar radiation, said steel pipe having a heat transfer fluid flowing through it, whereby solar energy absorbed by said material is withdrawn therefrom as useful energy; and said steel pipe being located at the focal point of a parabolic reflecting trough in which the evacuated glass pipe is positioned.

3,987,781

GREENHOUSE WINDOW FOR SOLAR HEAT ABSORBING SYSTEMS DERIVED FROM CD_2SNO_4

Arthur Jack Nozik, Westport, and Gottfried Haacke, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

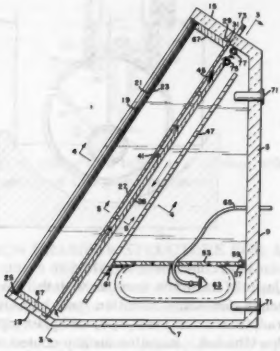
Division of Ser. No. 331,407, Feb. 12, 1973, Pat. No. 3,957,029. This application May 27, 1975, Ser. No. 580,869
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 4 Claims



1. A solar heat-absorbing system comprising a substrate having high transmittance for solar radiation which has deposited thereon a layer of cadmium stannate having high transmittance for solar radiation and high reflectance for thermal infrared radiation and positioned adjacent to said cadmium stannate layer a body having a high absorptivity for solar

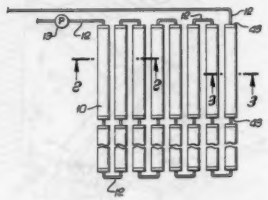
radiation, said body having heat transfer means attached thereto, whereby solar energy absorbed in said body is withdrawn therefrom as useful energy; said layer of cadmium stannate having been produced by spraying a solution containing cadmium and tin salts in a molar ratio of 2:1 onto the hot transparent substrate in the presence of an oxidizing agent.

3,987,782
SOLAR HEAT HOLDER
Herman Meier, Jr., Box 31, R.D., Coxsackie, N.Y. 12051
Filed June 16, 1975, Ser. No. 587,419
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **1 Claim**



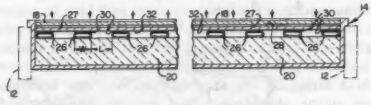
1. A closed-system, solar heat holder for thin-film solar heating of heat-transfer fluid contained therein; said solar heat holder comprising a tank, blackened copper plate absorbing surface, two insulated baffles, pneumatic container, heat exchanger means, transparent cover means, bimetalic thermostat valve, mirrors and bracket means; said tank being trough-shaped, of double-walled metal, water-tight and sandwiching therebetween insulation, and containing said heat-transfer fluid; said tank carrying said absorbing surface, baffles, heat exchanger means, transparent cover means, mirrors and bracket means; said baffles being parallel to each other and to said absorbing surface; said transparent cover means being insulated, comprising a pair of spaced-apart glass plates parallel to said absorbing surface, and thereby allowing solar energy to pass therethrough and to trap same between said transparent cover means and said absorbing surface to heat said absorbing surface and thereby said heat-transfer fluid; said absorbing surface and one of said baffles providing a thin-film spacing for said heat-transfer fluid therebetween; said bimetallic thermostat valve having one end fixed to one of said baffles and its other operative end engaging, in its closed position, said absorbing surface to control movement of said heat-transfer fluid between said absorbing surface and said baffle to which said one end of said bimetallic thermostat valve is fixed; said heat exchanger being adapted for flowing of fluid therethrough, and said thin-film, heated heat-transfer fluid being cooled upon giving up heat to said fluid in said heat exchanger, and said baffles allowing movement therebetween of said cooled heat-transfer fluid; said pneumatic container relieving internal pressure exerted by said heated heat-transfer fluid; said mirrors being disposed between said transparent cover means and said absorbing surface to reflect solar energy onto said absorbing surface during variations of incidence of such solar energy when the sun's rays are not perpendicular to said transparent cover means and hence absorbing surface; and said bracket means having holes formed therethrough and being joined to one of said baffles.

3,987,783
SOLAR HEATING PANEL
Hayward Powell, 3180 Carlin Ave., Lynwood, Calif. 90262
Filed July 7, 1975, Ser. No. 593,750
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **6 Claims**



1. In a solar heating panel, the combination of:
an elongate insulating base having a top and opposite edges;
a cover;
means for mounting said cover on said base at said opposite edges with said cover in sealing engagement with said base defining an air space between said cover and base, said cover mounting means including a clip at each opposite edge of said base, each of said clips having a first portion engaging said base and a second portion projecting outwardly and downwardly from said base with a channel for receiving the edge of said cover;
a heat collector mounted on said base; and
means for closing the ends of said air space.

3,987,784
SOLAR ENERGY ABSORBER PANEL
Joseph A. Godrick, Wellesley, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.
Filed Aug. 21, 1975, Ser. No. 606,512
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **8 Claims**



1. In a solar energy absorber panel comprising
a sheet of material having a surface for exposure to solar radiation, a thickness t_s, a thermal conductivity of k_s, and a density of ρ_s, and
a plurality of fluid conduits in thermal contact with said sheet and extending thereacross for conducting an energy transfer fluid across said sheet, said conduits having an average separation of L, and an average conduit width in contact with said sheet of W, and a weight per unit length of conduit of w_f;
the improvement wherein t_s has a value that substantially minimizes the expression

$$p_s t_s + \frac{w_t}{\left[\frac{8\,(T_L - T_0)\,k_s t_s}{S_{eff}}\right]^{1/2} + W},$$

yielding an optimum sheet thickness t_o, where T_L = the sheet temperature midway between the two adjacent conduits, T_0 = sheet temperature at a sheet portion aligned with a conduit, and S_{eff} = the effective insolation level; and

wherein L is $L = (8[T_L - T_0]k_s t_s/S_{eff})^{1/2}$;

whereby for a given S_{eff} and $(T_L - T_0)$, the weight per unit area of the solar energy absorber panel will be substantially minimized.

3,987,785

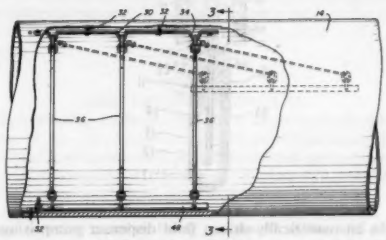
ENERGY SAVING DEVICE

LeBeau M. Long, 140 Boylston St., Boston, Mass. 02116

Filed Mar. 21, 1975, Ser. No. 560,606

Int. Cl.² F23L *13/00*

U.S. Cl. 126—296 **1 Claim**



1. In combination,

a furnace defining a combustion chamber having an output port for exiting exhaust gases from the combustion chamber,

a chimney,

a vent pipe coupling between the output port of the combustion chamber and the chimney,

three baffle plates all being of the same size and shape, all being flat and having top and bottom ends that are arcuate or circular in shape following the same circular locus and sides that are straight to permit optimum swinging of the plates,

each and every one of said baffle plates being closed in its central area and being constructed to cover an area greater than half the cross-sectional area of the pipe,

a pair of elongated brackets each having three V-shaped notches,

screws for securing the brackets in parallel and to the inside top of the pipe, the brackets being spaced from each other and disposed in side-by-side alignment,

said baffle plates each having two spaced top holes therein and a bottom hole,

a plurality of double ring supports some of which are for supporting the baffle plates from the brackets with each plate having two double ring supports interconnecting the V-shaped notches of adjacent brackets with the spaced top holes of the baffle plate,

an elongated rod having holes spacedly disposed therealong,

others of said plurality of double ring supports interconnecting, respectively, the bottom hole of each plate with the hole in the elongated rod thereby permitting all baffle plates to swing together being maintained in substantially parallel relationship regardless of their position,

an L-shaped stop bracket having one leg secured to the inside bottom wall of the vent pipe and having an upright leg with a face surface for contacting an end of the elongated rod to limit the swinging of the baffles.

3,987,786

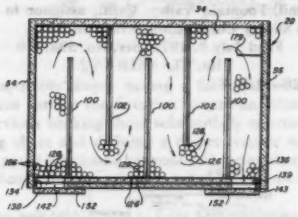
METHOD AND APPARATUS FOR COLLECTING, STORING AND TRANSMITTING SOLAR HEAT

John Harold Keyes, 141 Alpine Drive; Charles Irvin Strickland, and Robert George Strickland, both of 1st and Bridge Sts., all of Nederland, Colo. 80466

Filed Feb. 25, 1974, Ser. No. 445,473

Int. Cl.² F24J *3/02; F24H 7/00*

U.S. Cl. 126—400 **25 Claims**



1. A hot air solar furnace apparatus comprising in combination:

a framework defining an elongated storage chamber with a floor having an inlet to and an outlet from the storage chamber disposed therein,

heat retaining material substantially filling the storage chamber,

a solar heat collector through which air may be circulated in fluid communication with said outlet and inlet respectively of said storage chamber,

first pump means for circulating air through the heat collector and storage chamber,

second pump means for withdrawing air from the storage chamber and directing it out of the apparatus, and,

a series of baffle members in said storage chamber adapted to direct air flow through the storage chamber so that the surface area of contact of the air with the heat retaining material in the storage chamber is maximized, at least one of said baffle member being disposed between the inlet to the storage chamber and said second pump means.

3,987,787

PROCESS AND DEVICE FOR ALLEVIATION OF MUSCULAR AND NON-MUSCULAR PAIN AND DISCOMFORT

Steve Boxer, 13617 Sherman Way, Van Nuys, Calif. 91405, assignor to Steve Boxer, Van Nuys, Calif.

Continuation-in-part of Ser. No. 393,974, Sept. 4, 1973, Pat. No. 3,866,597. This application Feb. 14, 1975, Ser. No. 549,858

Int. Cl.² A61B *17/34*

U.S. Cl. 128—1 R **10 Claims**

1. A device for alleviating non-muscular pain and discomfort of a person's body by applying said device to at least four of the body's trigger points and trigger zones without puncturing said person's skin, comprising:

means for applying pressure to said trigger points and trigger zones, including,

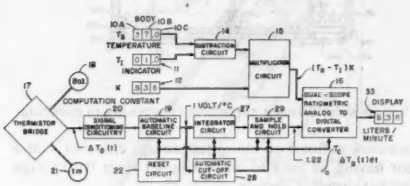
a base material having non-medicated adhesive properties, and at least one rigid pressure applying object affixed to said base material and adapted for contact with said trigger points and trigger zones, said object being non-elongated and of a shape so as to not easily puncture said person's skin, said object being located between said base material and the person's skin.

3,987,788

SYSTEM FOR COMPUTING CARDIAC FLOW RATES FROM THERMODILUTION MEASUREMENTS

Tuncay Emil, Fountain Valley, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed July 9, 1975, Ser. No. 594,210
Int. Cl.[2] A61B *5/02*
U.S. Cl. 128—2.05 F **12 Claims**



1. In a system for measuring blood flow rate by injecting a predetermined amount of indicator at a known initial temperature into the bloodstream and measuring the temperature of the blood at a location downstream of the point of injection, apparatus comprising: circuit means for generating a constant signal representative of the product of a computation constant times the quantity of the initial blood temperature minus the initial indicator temperature; means sensing the temperature of the blood downstream of the location of injection of said indicator for generating a thermodilution signal representative of the combined temperature of the blood and indicator; means responsive to said thermodilution signal for generating a signal representative of the integral of said thermodilution signal to a predetermined fraction of the peak value thereof on the decay portion of said thermodilution signal increased by a predetermined percentage, said signal being an estimated integral signal representative of the entire area beneath the thermodilution curve; dual-slope, ratiometric analog-to-digital converter means receiving said constant signal and said estimated integral signal for generating digital signals representative of the ratio of said constant signal to said estimated integral signal and including counter-circuit means for storing said digital signals; and display circuit means responsive to the output signals of said counter-circuit means for displaying visual indicia representative of the contents of said counter means, said visual signals being a measure of blood flow rate.

3,987,789

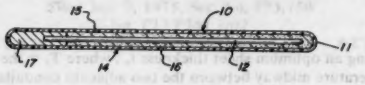
MALLEABLE PENILE PROSTHESIS

Gerald W. Timm, and John H. Burton, both of Minneapolis, Minn., assignors to American Medical Systems, Inc., St. Louis Park, Minn.

Filed Oct. 28, 1975, Ser. No. 626,373
Int. Cl.[2] A61F *5/00, 5/42*
U.S. Cl. 128—79 **7 Claims**

1. A prosthesis adapted to be implanted in a penis for treating erectile impotence, said prosthesis comprising:

at least one elongated, malleable rod portion adapted to be selectively conformed to a desired shape; and



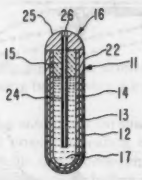
a generally tubular, physiologically inert covering for encapsulating said rod portion(s).

3,987,790

OSMOTICALLY DRIVEN FLUID DISPENSER

James Benjamin Eckenhoff, Palo Alto; Neil Arthur Johnson, and Su Il Yum, both of Sunnyvale, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Filed Oct. 1, 1975, Ser. No. 618,492
Int. Cl.[2] A61M *31/00*
U.S. Cl. 128—260 **17 Claims**



1. In an osmotically driven fluid dispenser comprising an inner flexible bag adapted to contain the fluid, an intermediate layer of an osmotically effective solute composition at least partly encapsulating the bag, an outer shape-retaining membrane encapsulating the layer of osmotically effective solute composition, said membrane being at least in part permeable to water, and a port that extends from the interior of the bag to the exterior of the dispenser through which the fluid may be charged into the bag and dispensed from the bag, the improvement comprising a conduit that is sized to fit snugly through the port and extending substantially into the interior of the bag after the fluid is charged into the bag.

3,987,791

ADDITIVE TRANSFER UNIT HAVING A SLIDABLE PIERCING MEMBER

Richard Marion Chittenden, Grayslake; Peter Lorin Bryant, Lake Bluff, and Charles Carlock Classen, Waukegan, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Continuation of Ser. No. 465,230, March 29, 1974, abandoned. This application July 31, 1975, Ser. No. 600,665
Int. Cl.[2] A61J *1/00*
U.S. Cl. 128—272.3 **6 Claims**

1. An additive transfer unit for storing and transferring of a medicament to a container having an exposed closure and a vacuum therein;

said transfer unit comprising a container for storing the medicament to be transferred, said container having a rigid neck portion defining a finish, the opening in said container being sealed by a closure affixed thereto;

said closure having a shoulder for resting against said finish of the rigid container neck, said closure including a puncturable stopper with a pierceable diaphragm portion positioned in sealing engagement with the opening in the container and in a substantially stationary manner;

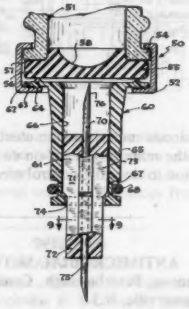
a tubular member having a cylindrical portion, the cylindrical portion including a central opening therein for slidably receiving a piercing member;

said tubular member including an undercut in the outside surface of the cylindrical portion thereof, sealing means positioned in said undercut;

a hood engageable with the cylindrical portion of the tubular member and the sealing means to cover the piercing member and tubular member prior to use of the unit;

said tubular member being positioned and arranged so that the opening therein overlies the diaphragm portion of said stopper;

crimping means to affix the closure and tubular member to the container;



said piercing member being positioned within said central opening in said member and having a passageway therethrough for the flow of said medicament and a point on both ends thereof;

said piercing member having an integral stop and being movable from the first position for entry through the closure of the vacuumized container with said integral stop constructed and arranged to contact said exposed closure of vacuumized container to a second position for puncturing of the stopper in the additive container to thereby provide a pathway between the containers and permit the medicament within the additive container to transfer into the vacuumized container.

3,987,792

DISPOSABLE DIAPER HAVING IMPROVED LIQUID RETENTION

John Michael Hernandez, East Brunswick, and Karl H. Roberts, Flemington, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed July 31, 1975, Ser. No. 600,931
Int. Cl.[2] A41B *13/02*; A61F *13/16*
U.S. Cl. 128—284 **11 Claims**

1. A disposable diaper comprising in order:

a water-pervious layer;

a spongy, resilient and compressible hydrophobic fibrous layer;

an absorbent core, and

a water impervious layer,

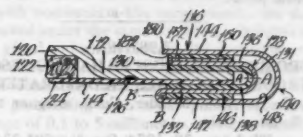
wherein said hydrophobic fibrous layer has a density of from about 0.01gm/cc to 0.03gm/cc and comprises non-woven, hydrophobic fibers having an average length of from about ¼ in to 3½ in, said fibers being bonded together at at least a substantial number of their points of contact, said hydrophobic fibrous layer in the uncompressed condition being pervious to fluids but when compressed, being substantially impervious to fluids, the compressed fibers intermeshing to form a fluid seal or barrier.

3,987,793

DIAPER WITH TAB FASTENER HAVING BACKING WEB AND FACE WEB

John P. Milnamow, North Barrington, Ill., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Sept. 29, 1975, Ser. No. 617,902
Int. Cl.[2] A61F *13/16*; A41B *13/02*
U.S. Cl. 128—287 **11 Claims**



1. A disposable diaper having a facing sheet defining a diaper inside surface for direction toward an infant, a moisture-impervious backing sheet substantially coextensive with said facing sheet and defining a diaper outside surface, an absorbent panel positioned between said facing sheet and said backing sheet, and an adhesive tab fastener means which comprises:

a backing web folded over to form first and second anchoring legs each having an inner face and an outer face, said web extending around and receiving a marginal portion of the diaper therebetween, and said inner face of said anchoring legs being provided with an adhesive coating by means of which said anchoring legs are permanently attached to said diaper marginal portion;

a face web having a fixed end permanently attached to said second leg, a free working end provided with a layer of pressure-sensitive adhesive on one face thereof and an adhesive-free central region between said fixed end and said free working end; and

release means on said outerface of said first anchoring leg of said backing web;

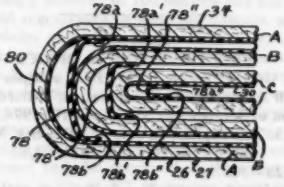
said free end being separable from said release means to make said free end available for use in securing said diaper about an infant.

3,987,794

DIAPER WITH ELASTIC CROTCH MEANS

Charles H. Schaar, Lake Zurich, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 519,493, Oct. 31, 1974, Pat. No. 3,951,115. This application Dec. 24, 1975, Ser. No. 644,287
Int. Cl.[2] A61F *13/16*; A41B *13/02*
U.S. Cl. 128—287 **6 Claims**



1. A disposable diaper, comprising: an absorbent pad assembly having an absorbent pad, a pair of waistline portions, a crotch portion intermediate said waistline portions, a front surface, a back surface, a pair of side edges, a pair of end edges connecting said side edges, a plurality of longitudinally extending folds defining a box-pleat configuration of the pad assembly, said pad assembly having a first pair of fold lines defining a longitudinally extending central panel, and a second pair of fold lines defining a pair of intermediate panels overly-

ing the front surface of the central panel and a pair of outermost panels overlying the intermediate panels, said pad assembly having a fold in said crotch region along a lateral fold line and defining end sections of the pad assembly with the back surfaces of the central panel end sections facing each other, and said pad assembly having an elastic band extending across said lateral fold line and having opposed ends secured on opposite sides of the lateral fold line to the back surface of said central panel.

3,987,795

ELECTROSURGICAL DEVICES HAVING SESQUIPOLAR ELECTRODE STRUCTURES INCORPORATED THEREIN

Charles F. Morrison, Boulder, Colo., assignor to Valleylab, Inc., Boulder, Colo.

Filed Aug. 28, 1974, Ser. No. 501,224
Int. Cl.² A61B 17/32; A61N 3/06
U.S. Cl. 128—303.14 **8 Claims**

1. An electrosurgical device adapted for connection to an electrical generator having active and return output terminals, said device being used to cut, coagulate, or otherwise treat human tissue or the like, said device comprising:

an insulative electrode support means;

an active electrode comprising at least one conductive element responsive to said active output terminal and a return electrode comprising at least one conductive element responsive to said return output terminal, said electrodes being supported by said electrode support means, the entirety of said return electrode being asymmetrically disposed with respect to said one element of said active electrode, said active and return electrodes being rigidly supported a fixed distance apart by said electrode support means, both said electrodes being adapted for electrical connection to said tissue, the ratio of the return electrode area adapted to electrically connect to said tissue to the active electrode area adapted to electrically connect to said tissue being in the range of approximately 2 to 200; and

means for connecting said active electrode to said active output terminal and said return electrode to said return output terminal

whereby said electrosurgical device can be used for cutting of said tissue due to said entirety of said return electrode being asymmetrically disposed with respect to said one active electrode element.

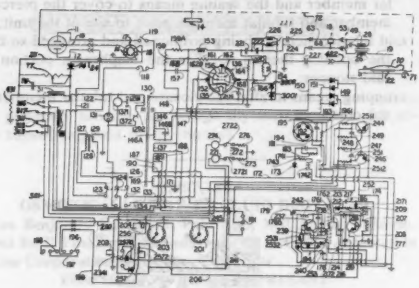
3,987,796

ELECTROSURGICAL DEVICE

Donald I. Gonser, Forest Park, Ohio, assignor to Dentsply Research & Development Corporation, Milford, Del.

Division of Ser. No. 461,983, April 18, 1974, Pat. No. 3,905,373. This application July 2, 1975, Ser. No. 592,480
Int. Cl.² A61B 17/36; A61N 3/02
U.S. Cl. 128—303.14 **2 Claims**

1. In combination with a radio-frequency electrosurgical device, a radio-frequency generator means for powering the radio-frequency electrosurgical device and having a main power off-on switch means and a patient monitor means for detecting an abnormal operation, control means connected to the patient monitor means, the control means having a set position in which the control means provides connection between the main power off-on switch means and the radio-frequency generator means for powering the radio-frequency generator means when the main power off-on switch means is in the on position and an unset position, means connected to the patient monitor means for advancing the control means to the unset position in the event of an abnormal operation, means for resetting the control means when the main power off-on switch means is turned to the off position, and an electrical hold-in circuit means for the electrosurgical device for requiring that the main power off-on switch means be turned to the off position to reset the control means for normal operation.



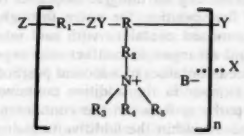
3,987,797

ANTIMICROBIAL SUTURES

Martin Stephenson, Peterborough, Canada, assignor to Ethicon, Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 445,404, Feb. 25, 1974, abandoned. This application Dec. 11, 1974, Ser. No. 531,643
Int. Cl.² A61L 17/00
U.S. Cl. 128—335.5 **29 Claims**

1. A surgical aid having long-lasting, leach resistant antimicrobial properties the surface of which is coated with an ionic block elastomer of the formula:



wherein R is C_1-15 alkylene, R_2 is lower alkylene, R_3, R_4 and R_5 are selected from hydrogen and lower alkyl, R_1 is a liquid prepolymer having a molecular weight from 1,000 to 3,000 selected from the class consisting of polyether, silicone, polyurethane, and polyamide; Z and Y are selected from hydroxyl and isocyanate groups, ZY is the urethane residue of the condensation of Z and Y; *n* is an integer from 10 to 1,000; B- is an anionic polymer and X is an anionic or cationic antimicrobial compound.

3,987,798

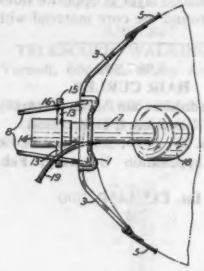
TRACHEOSTOMY TUBE AND RETAINER

Gerald E. McGinnis, Monroeville, Pa., assignor to Lanz Medical Products Corporation, Wilmerding, Pa.

Filed Mar. 20, 1975, Ser. No. 560,230
Int. Cl.² A61M 16/00, 25/02
U.S. Cl. 128—351 **4 Claims**

1. In combination, a tracheostomy tube for insertion in the trachea of a patient through a stoma in the front of his neck and trachea, the tube having a proximal portion for projecting forward from the stoma and a distal portion for extending down inside the trachea, a retaining member having a central body with an opening therethrough for adjustably receiving said proximal portion of said tube, the opposite ends of said central body having means for holding it against the neck of the patient, the retaining member also having a pair of later-

ally spaced struts at opposite sides of said opening connected at one end to said central body, and tube-holding means rigidly connected to the proximal portion of the tube and extending laterally therefrom in opposite directions for connection to



said struts extending forward beside the tube, whereby to hold the tube in place in the retaining member, said struts being provided with means for connecting said tube-holding means to the struts at different selected distances from said central body.

3,987,799

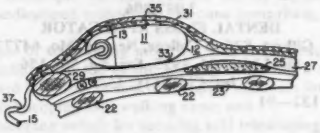
HEART PACER

David L. Purdy, Indiana; George J. Magovern, Pittsburgh, both of Pa., and Nicholas P. D. Smyth, Washington, D.C., assignors to Coratomic Inc., Indiana, Pa.

Continuation-in-part of Ser. No. 378,636, July 12, 1973, Pat. No. 3,866,616. This application Feb. 14, 1975, Ser. No. 550,071

Int. Cl.² A61N *1/36*

U.S. Cl. 128—419 P **5 Claims**



1. A heart pacer including a container having therein power-supply means and means for deriving pulsations to be supplied to the heart from said power-supply means, said container to be implanted a short distance below the clavicle of the human body, said container having the form generally of an ovaloid its contour as viewed from its ends, its top and bottom and its sides, being of generally oval 0 configuration whereby said pacer adapts itself positionally and cosmetically and with a minimum of discomfort to the region of the human body where it is implanted.

3,987,800

SMOKABLE PRODUCT WITH MEERSCHAUM PARTICLES

Antoine Artho, Boncourt, Switzerland; Monique Béringer, Saint Louis, Frankreich, France; Paul Buchman, Basel, and Robert Koch, Porrentruy, both of Switzerland, assignors to Tamag Basel AG, Switzerland

Filed July 2, 1974, Ser. No. 485,136

Claims priority, application Luxemburg, July 24, 1973, 68080

Int. Cl.² A24D *1/02*

U.S. Cl. 131—15 R **3 Claims**

1. In a smokable tobacco product having a paper cover and having meerschaum particles as an adsorbent, the improvement which comprises employing as the paper cover, a paper admixed with meerschaum particles having a diameter of 100 microns or less. said meerschaum particles consisting of breccia-like porous meerschaum which does not disintegrate in boiling nitric acid 1:1 but is soluble therein at the most ⅝ and which during heating to 300° C has a weight loss of at most 15% by weight and which has a magnesium content of at least 5% by weight based on the dry substance, which breccia-like porous meerschaum on account of its greater hardness scratches non-breccia like meerschaum and the density thereof, measured at the air-dried section, is about 1.2 g/cm³ compared with non-breccia-like meerschaum, the density of which measured under the same conditions, is between about 0.5 and 0.6 g/cm³ and which breccia-like porous meerschaum has a surface of at least 100 m²/g, said breccia-like porous meerschaum consisting essentially of the fine waste which results from granulating breccia-like porous meerschaum to obtain a range of 0.1 to 5 millimeters diameter, said breccia-like porous meerschaum being present in said paper in an amount effective to selectively adsorb polar harmful substances in tobacco smoke.

3,987,801

SMOKEABLE PRODUCT WITH MEERSCHAUM PARTICLES AS ABSORBENTS

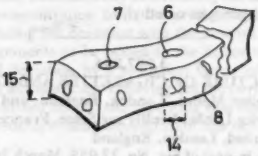
Antoine Artho, Boncourt, Switzerland; Monique Béringer, Saint Louis, France; Paul Buchmann, Basel, and Robert Koch, Porrentruy, both of Switzerland, assignors to Tamag Basel AG, Switzerland

Filed July 2, 1974, Ser. No. 485,137

Claims priority, application Luxemburg, July 24, 1973, 68081

Int. Cl.² A24B *3/14*

U.S. Cl. 131—17 R **3 Claims**



1. In a smokable product having meerschaum particles as an adsorbent and of which at least a part of the tobacco is regenerated tobacco formed of a natural or artificial tobacco pulp, the improvement which comprises employing meerschaum particles having a diameter of 100 microns and less in admixture with said regenerated or artificial tobacco, said meerschaum particles consisting of breccia-like porous meerschaum, which does not disintegrate in boiling nitric acid 1:1, but is soluble therein at the most ⅝ and which during heating to 300° C has a weight loss of at most 15% by weight and which has a magnesium content of at least 5% by weight based on the dry substance, which breccia-like porous meerschaum on account of its greater hardness, scratches the non-breccia-like meerschaum and the density thereof measured at the air-dried section is about 1.2 grams per cubic centimeter compared with the non-breccia-like meerschaum, the density of which measured under the same conditions, is about between 0.5 and 0.6 grams per cubic centimeter and which breccia-like porous meerschaum has a surface of at least 100 square meters per gram, said breccia-like porous meerschaum consisting essentially of the fine waste which results from granulating breccia-like porous meerschaum to obtain grains of 0.1 to 5 millimeters diameter, said breccia-like porous meerschaum being evenly distributed throughout said smokable product in an effective amount to selectively adsorb polar harmful substances in tobacco smoke.

3,987,802

CHITIN AS AN EXTENDER AND FILTER FOR TOBACCO

Paul Rolland Austin, Wilmington, Del., assignor to The University of Delaware, Newark, Del.

Filed Mar. 5, 1975, Ser. No. 555,546
Int. Cl.² A24B *15/00, 15/02*
U.S. Cl. 131—17 R 7 Claims

1. A tobacco mixture containing chitin, which is insoluble in dilute acetic acid, as an extender.

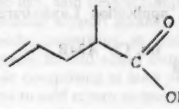
3,987,803

NOVEL PROCESS FOR ALTERING THE ORGANOLEPTIC PROPERTIES OF TOBACCO USING 2-METHYL-4-PENTENOIC ACID AND THE ETHYL ESTERS THEREOF

John B. Hall, Rumson; Ching Y. Tseng, Middletown; Manfred Hugo Vock, Locust; Joaquin Vinals, Red Bank, all of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 490,718, July 22, 1974, Pat. No. 3,907,718. This application Apr. 21, 1975, Ser. No. 569,854
Int. Cl.² A24B *3/12*
U.S. Cl. 131—17 R 2 Claims

2. A smoking tobacco article comprising smoking tobacco and from 50 up to 250 ppm of a compound having the structure:



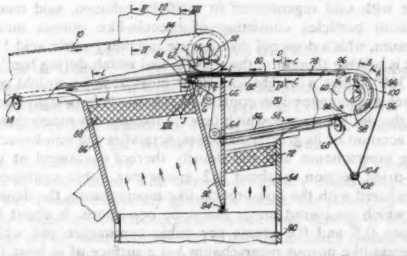
wherein R is hydrogen or ethyl.

3,987,804

MANUFACTURE OF CIGARETTES AND THE LIKE

Desmond Walter Molins, London, England, and Francis Auguste Maurice Labbe, Neuilly sur Seine, France, assignors to Molins Limited, London, England

Continuation-in-part of Ser. No. 22,955, March 26, 1970, Pat. No. 3,736,941. This application Sept. 25, 1972, Ser. No. 292,200
Claims priority, application United Kingdom, Apr. 2, 1969, 17135/69
Int. Cl.² A24C *5/18*
U.S. Cl. 131—84 B 84 Claims



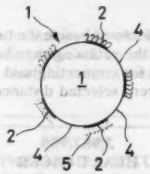
68. A machine for making a continuous cigarette rod having a central portion of particulate core material surrounded by an annulus portion of tobacco, said machine including a conveyor, means for forming a layer of tobacco having a predetermined width on said conveyor, means for forming a layer of said particulate core material having a width narrower than the width of said tobacco layer along the middle portion of the surface of said layer of tobacco such that the side edges of said core material layer are laterally spaced inwards from the side edges of said tobacco layer, and means for subsequently forming a layer of further tobacco on the surfaces of the core material layer and tobacco layer at opposite sides of said core material layer to surround the core material with tobacco.

3,987,805

HAIR CURLER

Wilhelm Schuster, Frankfurt am Main, Germany, assignor to Griso-Chemie AG, Landquart, Switzerland

Filed Feb. 25, 1974, Ser. No. 445,499
Claims priority, application Germany, Feb. 27, 1973, 2309650
Int. Cl.² A45D *2/00*
U.S. Cl. 132—40 10 Claims



1. A self-adhering hair curler comprising an elongated cylindrical body of resiliently compressible synthetic resin foam and substantially equidistantly spaced elongated strips of bristle material bonded to the peripheral surface of the body and extending longitudinally thereof.

3,987,806

DENTAL FLOSS APPLICATOR

Phylis L. Gilbert, 825 S. College, Nevada, Mo. 64772

Filed Mar. 24, 1975, Ser. No. 561,156
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 1 Claim

1. A dental floss applicator comprising:

a. an elongate member having one end portion with a handle adjacent thereto and another end portion extending therefrom;

b. a pair of laterally spaced apart fingers extending from said other end portion of said elongate member, said fingers and elongate member forming a U-shaped structure with said fingers diverging outwardly from said elongate member, said fingers enlarging in transverse thickness as they extend away from said elongate member forming a molar tooth shaped receiving cavity therebetween which is larger adjacent said elongate member than at a position spaced from said elongate member and permitting snug reception of a person's molar tooth therebetween;

c. floss receiving transversely aligned recesses in free ends of said fingers;

d. means at said other end portion of the elongate member forming shoulders facing away from the handle;

e. anchor means on said elongate member spaced from said fingers for securing engagement with a strand of floss

extending from said anchor means in engagement with a shoulder and then along a finger through a respective finger recess to the other finger recess then along the other finger to the shoulder and back to said anchor means.

3,987,807

TELESCOPIC WALKING CANE

Dennis H. Varnell, 6060 E. Berry Ave., Englewood, Colo. 80110

Filed Nov. 10, 1975, Ser. No. 630,708
Int. Cl.² A45B *1/04, 19/04, 3/00*
U.S. Cl. 135—66 1 Claim

1. A telescopic walking cane for use by handicapped or semi-handicapped individuals, the cane comprising, in combination:

a series of telescoping members with a conventional type handle at the top of the walking cane, and a spring disposed interiorly of said telescoping members for purposes of telescoping said walking cane; and

a telescoping switch for securing said telescoping members in place when said walking cane is in a collapsed position, consisting of a knurled button, an outside plate, and a dual latch provided with double indents at the bottom of said latch for securement of the inside top surface of all but the uppermost telescoping members within said indents, the upper inside surface of said telescoping members being conventionally provided with a flange rim around the diameter of said inside surface; and

a series of telescoping lock switches for holding the telescoping members in an extended position and consisting of an irregular U-shaped bracket, a top pivot button, and a bottom pivot button, with said telescoping lock switch affixed to the inside of all but the uppermost telescoping sections by means of a pivot pin mounted to a conventional support bracket; and

a concealed hooked latch provided in the top telescoping member for attachment of said walking cane to a hanger or a person's wearing apparel when said walking cane is not in use and with said latch being concealed with the cane in use; and

a thermometer built into the side of said walking cane for use by handicapped or semi-handicapped individuals for reading weather temperatures; and

ruler or inch measurements provided along the length of said walking cane for measurement of distances as desired by a handicapped or semi-handicapped individuals; and

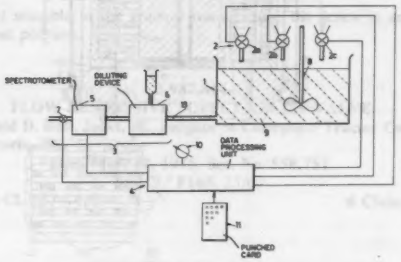
a light provided at the bottom tip of said walking cane, operated by a switch at the tip of the handle of said walking cane, and with said light being battery operated to illuminate dark crevices or corners.

3,987,808

METERING SYSTEM

Jose Carbonell, Bottmingen; Rolf Hasler, Oberwil, both of Switzerland, and Roland Walliser, Rixheim, France, assignors to Sandoz Ltd., Basel, Switzerland

Filed Jan. 7, 1975, Ser. No. 539,228
Claims priority, application United Kingdom, Jan. 11, 1974, 1307/74
Int. Cl.² G05D *11/08*
U.S. Cl. 137—3 25 Claims



15. A method of automatically producing a liquor containing a predetermined concentration of at least one component thereof which comprises effecting the operational cycle of measuring the concentration in a premixed liquor of a component which is to be ultimately present at a predetermined concentration, automatically determining the deviation of the measured concentration from the predetermined concentration, correlating the deviation with the amount of at least one of the components to be added to the liquor substantially to reduce said deviation by a reduction factor of less than 100 percent and automatically metering out the correlated amount into the premixed liquor, and repeating said operational cycle until the predetermined concentration has been substantially reached.

3,987,809

FLUID RESISTANCE DEVICE

Hans D. Baumann, Foxboro, Mass., assignor to Masoneilan International, Inc., Norwood, Mass.

Filed Feb. 14, 1975, Ser. No. 549,886
Int. Cl.² F15D *1/04*
U.S. Cl. 138—42 10 Claims

1. In a fluid system, a fluid resistance device comprising

a female member having a cylindrical opening therethrough;

a cylindrical male insert,

said female member and cylindrical male insert having ends,

said cylindrical male insert received within and engaged at said cylindrical opening of said female member,

said male insert and female member constituting parts of, and defining at their ends inlet and outlet sections within, said fluid system;

means forming a continuous, tortuous fluid path between said female member and male insert,

said fluid path arranged generally vertically of, and extending the full engaged length of, said female member and male insert, and thereby conducting fluid flow from said inlet section to said outlet section,

said fluid path forming means comprising

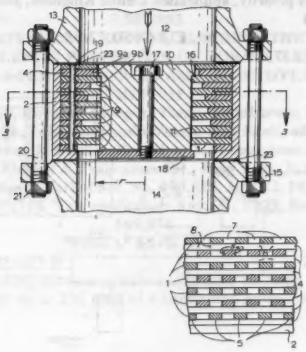
annular means defining vertically repeating layers of horizontal baffles,

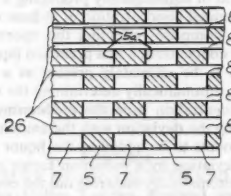
said horizontal baffles having widths and formed and spaced by vertically repeating layers of horizontal recesses in said

annular means, said horizontal recesses having widths, and

means vertically separating said horizontal baffle layers and forming therebetween horizontal circular channels having cross-sectional areas,

the cross-sectional area of said channels between said layers being such, in relation to the cross-sectional area of said recesses between said baffles, as to form throttling restric-





tions in series through which said fluid flow through said tortuous path is successively accelerated, and

said baffle widths being related to said recess widths and said baffle layers being successively oppositely angularly offset from the vertically adjacent baffle layer or layers such that said fluid flow through said tortuous path is continuously reversing between and around alternately vertically overlying baffles.

3,987,810

BURNER SCAVENGING VALVE

Curt Arnold Bjorklund, Box 99, Ulricehamn, Sweden

Continuation-in-part of Ser. No. 204,623, Dec. 3, 1971, abandoned. This application June 21, 1974, Ser. No. 481,841

Claims priority, application Germany, Dec. 7, 1970, 7045109[U]; Sweden, Mar. 17, 1971, 3410/71

Int. Cl.² F23D 11/28; F16K 11/00

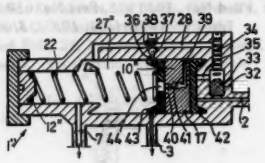
U.S. Cl. 137—107 **11 Claims**

1. A valve for controlling a burner fuel line, comprising;

a valve body having a valve chamber therein, a supply conduit connecting the valve chamber to the delivery side of a pump, a burner conduit having one end connected to the valve chamber and having a delivery end for connection to a burner to deliver fuel to be burned, a movable valve member disposed in the valve chamber for movement from a closing position wherein the valve member closes the supply conduit to a working position wherein the valve member permits fuel to flow from the pump to the burner, the valve member being movable to the working position in response to operation of the pump, means for returning the valve member to the closing position when the pump ceases to operate;

an evacuation channel for connecting the valve chamber with a suction side of the pump incident to the movement of the valve member from the working position to the closing position;

a check valve in said evacuation channel disposed for hydrostatically moving in one direction while said valve member moves from said closing position to said working



position, and for hydrostatically moving in the other direction during the returning of said valve member; and

means for defining a vacuum chamber rapidly communicatable with the burner conduit through the evacuation channel and the check valve therein during movement of the valve member, to provide in the vacuum chamber a low pressure effective to suck some fuel back from the delivery end of the burner conduit when the valve member moves from the working position to the closing position.

3,987,811

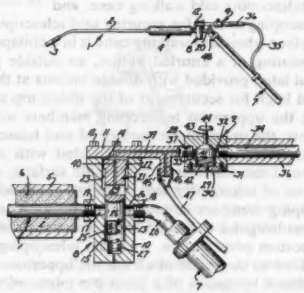
CONTROL VALVE MECHANISM FOR CLEANING APPARATUS USING FLUIDS

John F. Finger, Beresford, S. Dak., assignor to Sioux Steam Cleaner Corporation, Beresford, S. Dak.

Filed July 9, 1975, Ser. No. 594,525

Int. Cl.² F16K 31/143

U.S. Cl. 137—111 **2 Claims**



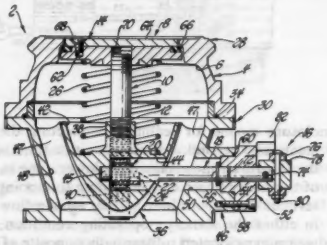
1. A control valve mechanism for cleaning apparatus using fluids comprising:

a. valve body means defining, a cylindrical bore providing a valve chamber, and a fluid passageway including axially aligned passage portions leading from said chamber in directions transversely of the axis of said chamber and to respective inlet and outlet ports for connection to a source of cleaning fluid under pressure and a discharge nozzle respectively;

b. fluid delivery means including a manually operated push button valve for introducing other fluid under pressure to a portion of said chamber remote from said passage portions;

c. a cylindrical valve element slidably mounted in said chamber for axial movements therein between axially spaced valve open and valve closed positions;
d. and yielding means biasing said valve element toward said valve closed position;
e. said valve element having a fluid passageway extending therethrough in a direction normal to the axis thereof and movable into and out of registration in axial alignment with said aligned passage portions upon movement of said valve element to its valve open and valve closed positions respectively;
f. said valve element having a restricted passageway establishing communication between said valve element passageway and said chamber portion remote from said passage portions for transfer of said other fluid from said manually operated valve to said fluid passageway when said valve element is in its valve open position.

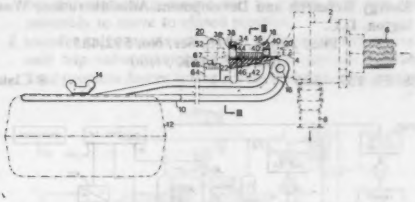
3,987,812
ADAPTER VALVE
Lowell F. Nelson, Muskegon, Mich., assignor to Enterprise Brass Works, Muskegon, Mich.
Filed Nov. 10, 1975, Ser. No. 630,303
Int. Cl.² F16K *31/54*
U.S. Cl. 137—219 **5 Claims**



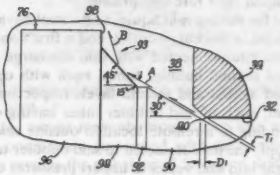
1. An adapter assembly comprising: an adapter body having a fluid passage extending therethrough, valve means for normally closing said adapter body fluid passage and movable to an open position, said valve means including a valve stem with a gear rack thereon, handle means exteriorly of said adapter body, a shaft connected to said handle means and extending into said adapter body, a pinion rotatably mounted on said shaft and engaging said gear rack, and lost motion connection means connecting said shaft to said pinion for rotating said pinion as said shaft is rotated to open said valve means and for allowing said pinion to rotate independently of said shaft to permit the automatic opening of said valve means.

3,987,813
PRESETTABLE VALVE ACTUATOR
Moshe Leczycki, Tel Aviv, Israel, assignor to Plasson Maagan Michael Industries Limited, Kibbutz Maagan Michael, Israel
Division of Ser. No. 443,856, Feb. 19, 1974, Pat. No. 3,905,271. This application June 26, 1975, Ser. No. 590,497
Claims priority, application Israel, Feb. 26, 1973, 41625
Int. Cl.² F16K *31/18*
U.S. Cl. 137—426 **3 Claims**

1. A valve actuator comprising an arm, a float carried at one end of the arm, the opposite end of the arm being pivotably mounted to a valve having an operator, and a screw and nut assembly carried at said pivotable end of the arm, the tip of the screw being engageable with the valve operator to actuate same and being threadably adjustable within the bore of the nut to preset the position thereof with respect to the valve operator, said screw including an enlarged head formed with parallel axial grooves, the valve arm carrying a retainer element seatable in the grooves for retaining the screw in any preset position.



3,987,814
FLOW RESPONSIVE POPPET RELIEF VALVE
Gerald D. Hall, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Mar. 17, 1975, Ser. No. 558,751
Int. Cl.² F16K *25/00*
U.S. Cl. 137—469 **6 Claims**

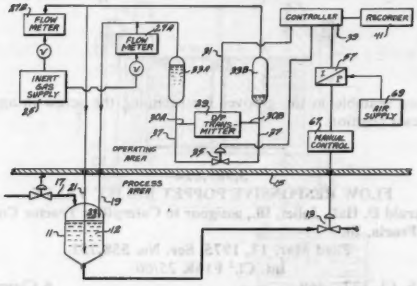


1. A flow responsive poppet relief valve comprising;
a housing having a bore and an inlet passage arranged along an axis, and an outlet chamber therebetween defining an annular valve seat with said inlet passage;
a poppet spool axially movable in said bore and including a head with a conical nose portion thereon having a first angular relationship with respect to said axis;
a spring disposed intermediate said housing and said spool for biasing said conical nose portion closably against said valve seat, and whereby said spool is axially opened by a fluid in said inlet passage at a predetermined pressure;
a gradually sloping frustoconical surface having a second angular relationship to said axis which is moderately greater than said first angular relationship formed on said head of said spool downstream of said conical nose portion and facingly arranged for exposure to the impingement of a relatively thin conical stream of fluid thereon at a relatively gradual angle of incidence within the range of approximately 10° to 20° when said spool is relieving fluid at a relatively low flow rate, and thus a reaction on said spool a relatively smaller proportion of which is an axial component; and
a steeply sloping shoulder portion having an angular relationship to said axis greater than said second angular relationship formed on said head in juxtaposed downstream relation to said frustoconical surface and facingly arranged for exposure to the impingement of at least a portion of a relatively thicker conical stream of fluid thereon at a greater angle of incidence when said spool is relieving fluid at a relatively high flow rate, and thus a reaction a relatively larger proportion of which is an axial component in order to achieve a stable response through a broad flow range and a relatively high degree of pressure regulation.

3,987,815
TANK DEPLETION FLOW CONTROLLER

Melvin A. Georgeson, Idaho Falls, Idaho, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 1, 1975, Ser. No. 592,485
Int. Cl.² F16K *31/00*
U.S. Cl. 137—486 **8 Claims**



1. A flow control system for remotely measuring and controlling liquid flow rate comprising:

a vessel for storing said liquid, said vessel having a controllable inlet, a discharge outlet, and a first controllable valve means interconnected with said discharge outlet;

first and second bubbler tubes, each with open ends positioned at first and second levels respectively within said vessel, each of said bubbler tubes having opposiite ends extending to a remote location outside said vessel;

gas supply means connected to said bubbler tubes for bleeding gas into said vessel to impart pressures of said first and second levels at said remote location;

a differential pressure transmitter at said remote location coupled to said first and said second bubbler tubes for generating a signal representing pressure difference;

pressure balancing means for repetitively equalizing the pressures imparted by said tubes to said differential pressure transmitter at uniform time intervals and thereby producing a sawtooth-shaped signal from said differential pressure transmitter, said pressure balancing means being coupled intermediate said bubbler tubes and said differential pressure transmitter; and

control means coupled to said differential pressure transmitter and to said first controllable valve means for monitoring said sawtooth-shaped signal during each uniform time interval as a measure of flow rate from said vessel and for controlling said first controllable valve means to regulate said flow.

3,987,816
ENTRANCE DUCT WITH WEIR

Norbert G. Lange, Sanborn, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Dec. 30, 1975, Ser. No. 645,509
Int. Cl.² F03B *7/07*
U.S. Cl. 137—563 **5 Claims**

1. An apparatus for holding a two phase solution having an upper phase and a lower phase comprising:

a housing comprising at least one sidewall and a bottom;

at least one sidewall provided with a pump inlet conduit opening in the lower half of the region of the lower phase, the opening sealingly secured to conduit means, the conduit means sealingly secured to the inlet of pumping means;

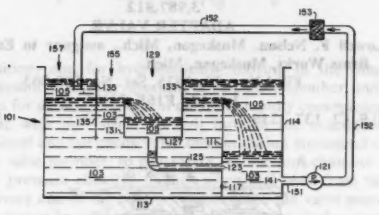
weir means for separating the part of the housing containing the lower phase into two parts, a pump-side part in direct communication with the pump inlet conduit opening, and a non-pump-side part, the weir means also provided with means for equalizing the level of each part of the lower phase when the two phase solution is in the static condition;

conduit means sealingly secured to an opening in the weir means and extending into the non-pump-side part of the lower phase, to a chamber, the chamber comprising,

a bottom plate having at least one edge having an opening which is sealingly secured to the conduit means,

first weir means sealingly secured to the at least one edge of the bottom plate and extending to a point above the level of the upper phase so that no overflow will occur in either the static or operating condition,

second weir means sealingly secured to the at least one edge of the bottom plate and extending to a point in the region of the upper phase when the two phase solution is in the static condition, the second weir means substantially opposite the first weir means,



enclosure means for sealingly connecting the first weir means and second weir means with a third weir means, the third weir means having a lower edge in the region of the lower phase and extending to a point above the level of the upper phase so that no overflow will occur in either the static or operating condition, said third weir means located substantially opposite of the second weir means from said first weir means, the means for sealingly connecting the first weir means, second weir means and third means extending from at least the bottom edge of each of said weir means to at least the upper edge of each of said weir means to form a sealed sub-chamber consisting of the bottom plate, first weir means, second weir means and enclosure means;

conduit means sealingly secured to the outlet of said pumping means and extending to a point in the region on the opposite side of said third weir means from said second weir means.

3,987,817
TEST VALVE FOR FLUID ACTUATED PILOT VALVE

Clifford M. Peters, Longview, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed Dec. 24, 1975, Ser. No. 643,968
Int. Cl.² G01L *27/00*
U.S. Cl. 137—625.4 **4 Claims**

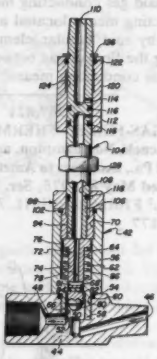
1. A test valve structure for closing a first fluid pressure source acting on a valve means and communicating an alternate fluid pressure source to act on the valve means for testing the valve means comprising:

a. a test valve for positioning between the first fluid pressure source and the valve means to be tested, said test valve including a body having fluid inlet and outlet passageways both passageways communicating with a valve chamber having a valve seat therein;

b. an elongated housing secured to said body and having a central bore therein in fluid communication with the valve chamber, said central bore having enlarged diameter inner and outer bore portions connected by a small diameter intermediate bore portion;

c. a plunger within the central bore having an end portion fitting closely within the small diameter intermediate bore portion and a valve member on its inner end within the enlarged diameter inner bore portion, said plunger being movable between a projected seated portion of the valve member on the valve seat within the valve chamber to block fluid flow between the inlet and outlet passageways and a retracted unseated position of the valve member permitting fluid flow between the inlet and outlet passageways;

d. a spring mounted within the upper bore portion and urging the plunger continuously into an unseated portion



in which the flow of fluid is maintained between the inlet and outlet passageways through the valve chamber, said plunger having a fluid inlet passage adjacent its outer end and a discharge passage adjacent its inner end at the adjacent intermediate bore portion, and

e. an annular sealing member about the plunger between the discharge passage and the valve member and sealing between the plunger and the intermediate bore portion in the retracted position of the plunger, said annular sealing member and said discharge passage being positioned within the inner enlarged diameter bore portion when the valve member is seated in projected position of the plunger.

3,987,818

SAFETY TRIP VALVE FOR STEAM OR GAS TURBINES WITH MEANS TO ASSURE CONTROLLED OPENING FROM THE CLOSED POSITION

John G. Williams, Warren, N.J., assignor to Turbodyne Corporation, Wellsville, N.Y.

Filed June 19, 1975, Ser. No. 588,409

Int. Cl.² F16K *31/143*

U.S. Cl. 137—630.13 **4 Claims**

1. A safety trip valve for controlling the flow of operating fluid at high temperatures and high pressure to a turbine comprising:

a. valve housing means defining a flow chamber having, an inlet and an outlet in communication with said flow chamber,

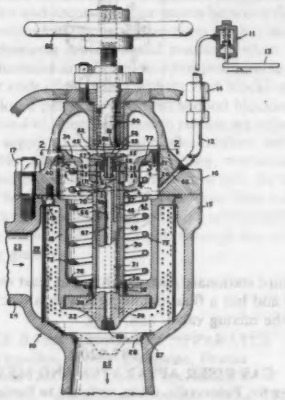
b. valve seat means in the valve housing means having a valve port therethrough for passing fluid from the inlet to the outlet,

c. a trip valve assembly in the valve housing means having, a valve head for engagement with the valve seat means to open and close the valve port, and an actuating means for the valve head,

d. means for delivering operating fluid from said inlet to said actuating means to provide pressure forces for maintaining the trip valve assembly in normally open position,

e. means connected to said valve housing means responsive to adverse operating conditions to pass operating fluid acting on the actuating means to atmosphere so as to unbalance the inlet operating fluid pressure forces acting on said actuating means and to cause said trip valve assembly to move to closed position,

f. transfer valve means connected to the actuating means on said trip valve assembly to balance opposed operating fluid pressure forces acting across said actuating means so



as to aid in maintaining the trip valve assembly in closed position, and

g. positioning means movably mounted on said valve housing and operatively associated with said transfer valve means to reverse the unbalanced forces on said actuating means whereby on opening movement of the positioning means the inlet operating fluid will exert pressure forces on the actuating means to cause the trip valve assembly to follow opening movement of said positioning means.

3,987,819

MIXING VALVE SYSTEM

Klaus Scheuermann, Unteres Plantahaus, CH 7524 Zuoz, Switzerland

Filed Mar. 17, 1975, Ser. No. 559,244

Claims priority, application Germany, Mar. 20, 1974, 2413420

Int. Cl.² F16K *11/18, 11/22*

U.S. Cl. 137—637.3 **10 Claims**

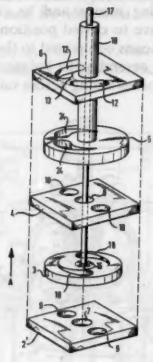
1. A mixing valve system for the ouput of liquid in a selectable amount of outflow of a temperature which can be chosen by mixing suitable parts of hot and cold liquid, having at least one stationary ceramic disk with inflow openings therein which have a fluid connection with inlets for hot and cold liquid, and having at least one rotatable ceramic disk which rests sealingly and slidingly on the stationary ceramic disk having at least one throughflow opening, comprising an arrangement of disks which lie directly on one another having:

a. a first stationary disk having inflow openings which are center-symmetrically opposite one another, a rotatable volume selector disk having two equally shaped center-symmetrically oppositely positioned throughflow openings of a shape tapering at least in one direction of rotation for the similar spanning of the inflow openings,

b. a second stationary disk having throughflow openings which are formed and arranged corresponding with the inflow openings of the first stationary disk,

c. a temperature selector disk which is rotatable separately from the volume selector disk and has at least two uniform throughflow openings which are arranged in mirror image to one another and have a shape which tapers in at

least one direction of rotation, for a variable spanning of the throughflow openings of the second stationary disk, and



d. a third stationary disk which has at least one outlet opening and has a fluid connection with a discharge member of the mixing valve.

3,987,820

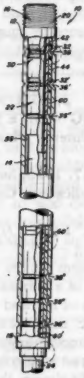
GAS RISER APPARATUS AND METHOD

Sam Alewitz, Painesville, Ohio, assignor to Perfection Corporation, Madison, Ohio

Continuation-in-part of Ser. No. 349,681, April 10, 1973, abandoned. This application Aug. 6, 1974, Ser. No. 495,200

Int. Cl.[2] F16L *9/20, 9/22*

U.S. Cl. 138—109 **16 Claims**



1. A double-walled riser apparatus for conducting gas from a non-metallic service line disposed below ground level to a point of delivery at a member above ground level, said apparatus comprising in combination:

a tubular element having a first end and a second end, said first end being adapted to be disposed above ground level there being provided means at said first end to connect said tubular element to a delivery member, said tubular element having a sufficient length such that said second end thereof is disposed below ground level;

gas conducting means having a first end and a second end, said first end of said gas conducting means being disposed within said tubular element substantially adjacent said first end thereof, said gas conducting means extending through said tubular element at said second end thereof such that said second end of said gas conducting means extends from said tubular means;

sealing means between said tubular element and said gas conducting means substantially adjacent the respective first ends thereof, said sealing means coacting with said tubular element and said gas conducting means;

said tubular element being defined by a metallic member;

said gas conducting means being defined, at the second end thereof, by a non-metallic tubular member, there being provided means at said second end of said gas conducting means to interconnect said gas conducting means to a non-metallic service line disposed below ground level;

whereby, gas from a buried non-metallic service line may be conducted to a delivery member above ground level by means of said gas conducting means, the portion of said gas conducting means located above ground level being protected by said tubular element, said sealing means prohibiting the flow of gas between said tubular element and said gas conducting means.

3,987,821

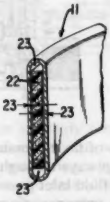
GAS-FILLED THERMOMETER

Leonard J. Bohenek, Northampton, and David G. Grier, Elkins Park, both of Pa., assignors to Ametek, Inc., New York, N.Y.

Filed May 8, 1975, Ser. No. 575,824

Int. Cl.[2] F16L *9/00;* **G01L** *7/04;* **G01K** *5/02*

U.S. Cl. 138—177 **4 Claims**



1. A Bourdon sensing element for a gas temperature gauge comprising a flattened tubular metallic element, and a high temperature resistant elastomeric material filling substantially the entire interior volume of the metallic element and extending transversely across the element but spaced a small distance from the interior surface of said element to define a small passage means along the inner surface within which a fluid filling is received.

3,987,822

BAND WHEEL ON A SHUTTLELESS LOOM

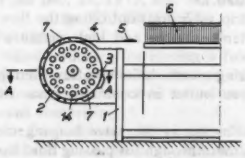
Erhard Freisler, Bubikon, Switzerland, assignor to Ruti Machinery Works Ltd., Ruti, Zurich, Switzerland

Filed Mar. 10, 1975, Ser. No. 557,087

Claims priority, application Switzerland, Mar. 11, 1974, 3341/74

Int. Cl.[2] D03D *47/12*

U.S. Cl. 139—449 **14 Claims**



1. Band wheel of light weight construction for a shuttleless loom operatively carrying a flexible band for the insertion of a filling thread during the oscillating movement of said band wheel produced by the alternate rotations of the band wheel; said band wheel having a hub adapted to rotate about an axis of rotation of said wheel and a wheel body connected with the hub; said wheel body comprising at least a circular disk fixed on said hub to rotate about the axis of rotation and formed by

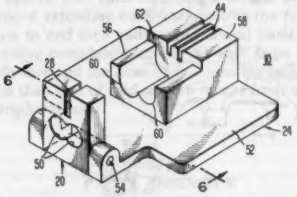
a flat element extending transverse to the axis of rotation, and reinforcing elements attached to the disk and formed by flat elements extending parallel to the axis of rotation.

3,987,823

RETRACTABLE WIRE GUIDE FOR WIRE WRAP GUN

Samuel Richard Romania, and George Joseph Sprenkle, both of Phoenixville, Pa., assignors to Burroughs Corporation, Detroit, Mich.

Filed Nov. 28, 1975, Ser. No. 635,870
Int. Cl.² B21F 15/00
U.S. Cl. 140—124 7 Claims



1. A retractable wire guide attachment for a front loading wire wrap gun which includes at least one wrapping tool bit having a wire feed opening and a terminal receiving aperture and wherein said wrapping bit is enclosed in a sleeve comprising:

a wire retaining block affixed to said sleeve,

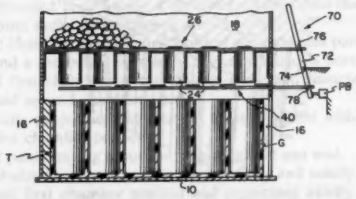
a guide member pivotally attached to said retaining block and being capable of assuming a load position in proximity to said wrapping bit and a retracted position away from said bit, said guide member having at least one slot in substantial alignment with said wire feed opening when said guide member is in said load position, said slot guiding the end of the wire to be wrapped into said feed opening, the terminal receiving aperture in said wrapping bit being blocked by said guide member in its load position to prevent the inadvertent insertion of said wire into said aperture.

3,987,824

WATER GLASS FILLER

Fred W. Zehnder, 590 Frederick St., Frankenmuth, Mich. 48734

Filed Jan. 27, 1975, Ser. No. 544,140
Int. Cl.² B65B 1/04, 3/04
U.S. Cl. 141—99 12 Claims



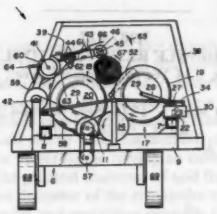
1. Apparatus for filling a trayful of glasses with a measured mixture of ice cubes and liquid, said apparatus comprising locating means for supporting and locating a trayful of glasses to be filled at a filling station, a plurality of like open ended vertically disposed tubes, mounting means mounting said tubes above said filling station with each tube located in vertical alignment with a glass in a trayful of glasses at said filling station, the internal volume of one of said tubes being less than that of a glass to be filled, ice cube containing bin means mounted above said tubes, first shutter means mounted above said tubes for movement between a closed position blocking communication between said bin means and said tubes and an open position accommodating gravitational flow of ice cubes from said bin means simultaneously into said tubes, second shutter means mounted below said tubes for movement between a closed position blocking the lower ends of said tubes to retain ice cubes therein and an open position accommodating gravitational flow of ice cubes from said tubes into the underlying glasses in said trayful of glasses, means for shifting each of said first and second shutter means between their open and closed positions in opposite directions so that the second blocking mechanisms are in closed positions when the first blocking mechanisms are shifted to open positions to pass ice into the upper ends of the tubes and the first blocking mechanisms are in closed positions when the second blocking mechanisms are moved to open positions to release ice cubes to the glasses, liquid supply means on each of said tubes, and control means operable when the first blocking mechanisms are moved to closed positions to cut off ice flow into the tubes for actuating said liquid supply means to dispense from said liquid supply means a measured volume of liquid substantially simultaneously into each of said tubes and through the tubes into the underlying glasses.

3,987,825

TREE BARK REMOVING APPARATUS

Jean-Claude Vignolles, 40610 Arengosse, France

Filed Oct. 9, 1975, Ser. No. 621,158
Claims priority, application France, Oct. 15, 1974, 74.35236
Int. Cl.² B27L 1/04
U.S. Cl. 144—208 F 19 Claims



1. A tree bark removing apparatus comprising a frame structure having a longitudinal axis and spaced side frame members, as well as cross frame members, tree drive means rotatably supported on said frame structure, first and second rows of wheel means, each row including a number of wheels, support means for individually supporting each wheel on said frame structure in a substantially vertical plane, said rows of wheels extending in parallel to each other and spaced from each other to form a tree trunk passage, said drive means rotating said wheels, tool support means secured to said frame structure, tool means rotatably supported by said tool support means above said trunk passage for contacting a tree travelling through said passage, tool drive means operatively connected to said tool means, wherein said tree drive means comprise a longitudinal drive roller rotatably supported between said side frame members, said wheel support means supporting said wheels to contact said longitudinal drive roller, and power drive transmission means operatively connected to said longitudinal drive roller.

3,987,826

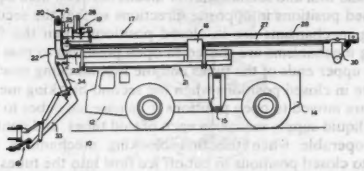
COMPACT TREE CLAMP AND AUTOMATIC SEQUENCE CONTROL FOR A TREE LENGTH HARVESTER

Ian McKenzie, Lambeth, Canada, assignor to Clark Equipment Company, Buchanan, Mich.

Division of Ser. No. 452,171, March 18, 1974, Pat. No. 3,924,667. This application June 16, 1975, Ser. No. 587,025

Int. Cl.² A01G *23/08*

U.S. Cl. 144—309 AC 4 Claims



4. A tree harvesting method comprising the steps of cutting and holding a standing tree upright, pivoting the tree from a vertical to a substantially horizontal position, clamping the tree in the horizontal position near the butt end by securing it between fixed and movable clamping means, said fixed clamping means including a stationary frame having a fixed jaw for receiving the butt end of the tree and said movable clamping means including a movable jaw having a pair of pivotable elements comprising a first element pivotally mounted on the frame on one side of the longitudinal axis of the tree, and a second element being pivotally mounted on the opposite side, the movable jaw being closeable on the fixed jaw, delimbing the tree by traveling a cutting means from adjacent the butt end of the tree toward the top for removing the limbs, lifting the tree with said movable clamping means after the cutting means has cleared the tree, swinging the butt end laterally relative to the delimber axis, and thereafter releasing the tree.

3,987,827

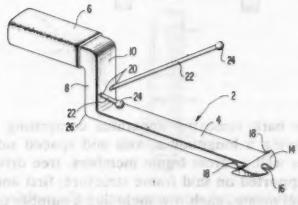
SHINGLE REMOVING TOOL

William R. Mills, 534 W. Montgomery Ave., Rockville, Md. 20850

Filed Mar. 5, 1976, Ser. No. 664,251

Int. Cl.² B66F *15/00*

U.S. Cl. 145—1 A 5 Claims



1. A shingle-removing tool comprising an elongate crowbar having forwardly and rearwardly-extending free end portions said crowbar having an angle providing a fulcrum intermediate said end portion whereby said crowbar operates as a lever of first class, nail-head engaging means on said forwardly-extending free end portion, and arms projecting laterally beyond each side of said crowbar,

said arms having free end portions spaced outwardly beyond and above each side of said forwardly-projecting free end portion between the fulcrum and the nail-head engaging means and constituting means for engaging beneath a shingle covering the one to be removed.

3,987,828

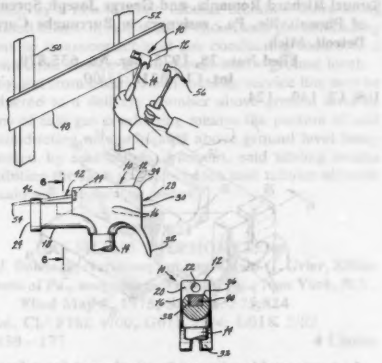
HAMMER

John L. Matheis, 8 Delmar Drive, Springfield, Ill. 62703

Filed May 21, 1975, Ser. No. 579,563

Int. Cl.² B25C *1/00*; B25D *1/00*

U.S. Cl. 145—30 A 6 Claims



1. In a hammer head having an ordinary nail driving face formed adjacent one end of a muzzle and a claw at the other end thereof, the improvement comprising a preliminary nail driving face between the ordinary nail driving face and the claw, a recess in the preliminary nail driving face, said recess adapted to freely receive a nail head a flattened anvil face adjacent the claw and a magnet in the muzzle adjacent but below said recess such that the shank of a nail held by said hammer head will not be in substantial contact with said magnet wherein the ordinary nail driving face and the flattened anvil face are substantially parallel, wherein the flattened anvil face is located directly behind the ordinary nail driving face and the preliminary nail driving face, and wherein the flattened anvil face is adapted to be struck by a second hammer.

3,987,829

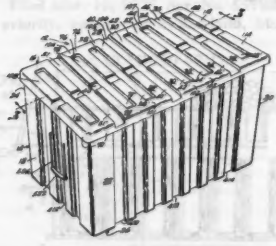
CONTAINER WITH LID

Anthony J. Leone, 3301 Raleigh St. 4F, Hollywood, Fla. 33021

Filed May 5, 1975, Ser. No. 574,299

Int. Cl.² B65D *1/22*

U.S. Cl. 150—.5 8 Claims



1. A plastic container comprising:

A. a one-piece lid having

a. a roof with an elevated peripheral zone having an outer margin,

b. a continuous downturned skirt extending downwardly from the outer margin of the peripheral zone, said skirt having an inner and outer side and end faces, and

c. said roof having downwardly extending septum means spaced inwardly from the inner surface of said skirt,

defining a downwardly opening peripheral recess between the septum means, elevated peripheral zone and the skirt; and

B. a one-piece receptacle having

a. side walls and end walls spanned by a floor,

b. said walls having an inner face and an outer face and terminating at a rim surface,

c. the inner and outer faces of said walls at said rim surface comprising an abutment zone,

d. said rim surface being sized for receipt within said downwardly opening peripheral recess with said septum means and inner face of said skirt closely adjacent said abutment zone;

e. a central roof zone including a central shipping band groove extending completely across the roof from end face to end face and spaced lateral band grooves extending completely across the roof from side face to side face and the floor of said grooves being of a depth less than that of said septum means from said elevated peripheral zone.

3,987,830

PANEL ASSEMBLY

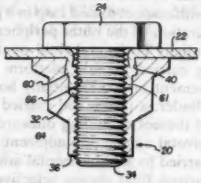
Harold A. Ladouceur, Livonia, Mich., assignor to Multifastener Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 149,517, June 3, 1971, abandoned. This application Apr. 20, 1973, Ser. No. 353,049

Claims priority, application Australia, May 6, 1972, 43106/72; United Kingdom, June 2, 1972, 25761/72; Canada, June 2, 1972, 143694

Int. Cl.² F16B *39/282*

U.S. Cl. 151—41.73 1 Claim



1. A nut and panel assembly, comprising:

an integral metal nut having one end abutting one face of said panel and a passage extending through said nut having an axis generally normal to said panel face,

said nut passage including an enlarged chamber located adjacent said panel terminating in a generally cylindrical threaded bore having a diameter smaller than the maximum radial dimension of said chamber,

said chamber having a first portion adjacent said panel face and a second portion adjacent said threaded bore,

said first chamber portion having a greater diameter than said second chamber portion,

radially projecting antirotation means located within said first chamber portion,

said panel having a portion engaging said nut end,

a tubular panel portion displaced radially and axially within said first chamber portion and projecting axially within said second chamber portion,

said tubular panel portion terminating in an opening coaxially aligned with said nut bore,

the exterior surface of said tubular panel portion engaging the surface of said radially projecting antirotation means preventing relative rotation between said panel and said nut,

the interior surface of said tubular panel portion within said second chamber portion having a female thread,

said female thread having a pitch diameter substantially equal to the pitch diameter of said nut bore,

the interior surface of said tubular panel portion within said first chamber portion having a greater internal diameter than said threaded tubular portion,

a self-threading male threaded member having a pitch diameter generally equal to the pitch diameter of said threaded nut bore,

said male threaded member threadably received in said threaded tubular portion within said second chamber portion but spaced from said internal wall of said tubular portion within said first chamber portion and said first chamber portion extending axially a distance equal to at least one full thread of said male threaded member.

3,987,831

ANTI-SKID STUD FOR PNEUMATIC VEHICLE TIRES

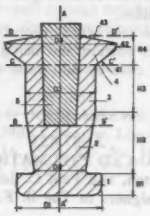
Jean Walrave, Meylan, and Jean Champiot, Seyssins, both of France, assignors to Ugine Carbone, Grenoble, France

Filed July 1, 1975, Ser. No. 592,350

Claims priority, application France, July 19, 1974, 74.25147

Int. Cl.² B60C *11/16*

U.S. Cl. 152—210 8 Claims



1. For use in road vehicle tires incorporating an outer road surface engaging tread, an anti-skid stud comprising a carbide rod enclosed in a sleeve made of a material which is self-destructible in operation, said sleeve being a single tube composed of cylindrical and/or frustoconical components, and an upper flange, said sleeve being anchorable completely within the tire with the upper flange having an outer face flush with the tire tread, the greatest diameter of said flange being larger than the greatest diameter of the remainder of the sleeve, said rod having an outer end projecting centrally outward from the outer face of said upper flange, the self-destructible nature of the material of the sleeve providing a stability in the projection of the stud throughout the wear life thereof.

3,987,832

SOLID WHEEL REINFORCED

Peter Funke, Munich, Germany, assignor to ISPOW AG, Chur, Switzerland

Filed Oct. 10, 1974, Ser. No. 513,839

Claims priority, application Germany, Oct. 17, 1973, 2352158

Int. Cl.² B60C *7/22*

U.S. Cl. 152—310 5 Claims

1. A wheel comprising:

a. a hub member defining an axis of rotation;

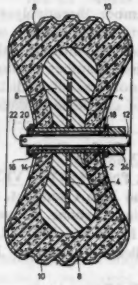
b. a core mounted on said hub member,

1. said core having two side faces radially extending outward from said hub member and an outer circumferential face connecting said side faces,

2. respective axial end portions of said hub member axially projecting from said side faces; and

c. a unitary casing consisting essentially of plastic and engaging said end portions,

1. said casing having a jacket portion enveloping said core, respective parts of said jacket portion engaging said faces of said core, and a leather-like skin portion axially and radially covering said parts of said jacket portion,



2. said jacket portion consisting of said plastic in foamed, porous condition,

3. said plastic in said skin portion being less porous than in said jacket portion and being separated from said faces of said core by said parts of said jacket portion respectively.

3,987,833

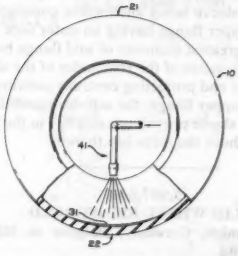
BALANCED PNEUMATIC TIRE

Joe A. Powell, Norton, and Paul C. James, Cuyahoga Falls, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 494,765, Aug. 5, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,299

Int. Cl.² B60B *13/00*; B60C *5/00*

U.S. Cl. 152—330 R **11 Claims**



5. In a pneumatic tire with a prelocated circumferential zone indicating an area of maximum unbalance, the improvement wherein the tire has a thin layer of a polyolefin material, the material capable of attaining a viscosity of at least 20,000 centipoise at a given temperature between 120° F and 140° F, over a circumferential area of about 30° to 60° of the inner periphery of the tire centered on the area essentially 180° from the area of maximum unbalance of the tire, wherein the thin layer of material is of sufficient mass to counterbalance the amount of unbalance in the tire, and wherein the thin layer of material at normal tire operating temperatures adheres to the area of the inner periphery of the tire essentially solely by surface tension.

3,987,834

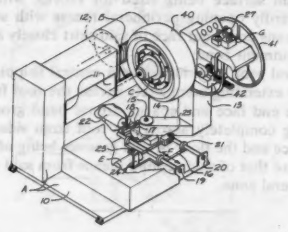
TIRE BUFFING APPARATUS AND METHOD

Victor H. Hopple, Greenville, S.C., and Richard H. Niehaus, Cincinnati, Ohio, assignors to American Manufacturing & Equipment, Inc., Cincinnati, Ohio

Filed June 23, 1975, Ser. No. 589,450

Int. Cl.² B29H *17/40*

U.S. Cl. 157—13 **9 Claims**



6. A tire buffing apparatus comprising a frame; a driven rasp mounted for rotation on a horizontal axis carried by said frame; a platform carried for movement toward and away from said rasp in a path substantially normal to said horizontal axis; yieldable means normally exerting a force urging said platform toward said rasp along said path; a horizontal arm pivoted adjacent one end thereof for movement in a horizontal plane on said platform; a vertical standard carried by said frame adjacent the other end of said horizontal arm; a driven tire mount carried on a horizontal axis adjacent an upper end of said standard for carrying a tire for movement into operating engagement with said rasp; co-acting cam and cam follower means carried by said frame and by said platform for moving said tire with respect to said rasp in a path corresponding to the configuration of the outer periphery of said tire; an elongated substantially horizontal fluid operated cylinder; a pivotal mounting carried by said platform positioning said cylinder for movement in a substantially horizontal plane; a piston in said cylinder; a piston rod carried by said cylinder adjacent one end thereof extending outwardly of one end of said cylinder a pivotal connection adjacent the other end of said piston rod carried by said horizontal arm intermediate its ends; and pressurized fluid means selectively connected to said cylinder on each side of said piston for imparting movement to said arm in said horizontal plane moving said tire in said path with respect to said rasp thereby buffing the tire.

3,987,835

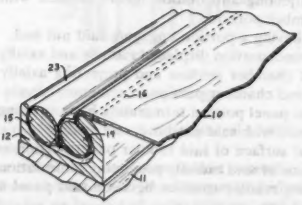
DOUBLE CORD EDGE FASTENER

Roger D. Bloomfield, Jackson, Wyo., assignor to Frank D. Werner, Jackson, Wyo.

Continuation-in-part of Ser. No. 315,283, Dec. 15, 1972, abandoned, which is a continuation-in-part of Ser. No. 249,962, May 3, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 518,346

Int. Cl.² A47H *13/00*

U.S. Cl. 160—392 **18 Claims**



1. A cover assembly comprising a flexible sheet of material, a rigid lock channel, and elongated bead means positioned in

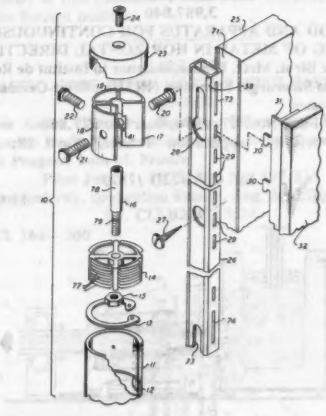
said lock channel and engaging said flexible sheet so that said flexible sheet is retained with respect to said bead means and lock channel, said bead means having spaced, coextensive longitudinal edge portions and being movable in said lock channel from tension forces in said flexible sheet, said lock channel having a base and a pair of upstand wall means fixed to said base and spaced apart to form an opening at upper edges thereof, and said wall means having facing concave surfaces, one of said wall means having a rounded upper edge over which said flexible sheet extends, said one wall means forming one of said concave surfaces to be substantially more concave than the other concave surface to permit one longitudinal edge portion of said bead means to nest into said substantially more concave surface so the opposite longitudinal edge portion of said bead means clears the upper edge of the other wall means for insertion into the lock channel, and means comprising a lock bead member forming the opposite longitudinal edge portion of said bead means and positioned in said lock channel so that when said bead means engages said one concave surface from tension in said flexible sheet transferred around the rounded edge tending to pull said bead means out of said lock channel the lock bead member will be forced by other portions of said bead means to engage the other wall means of said lock channel to prevent said bead means from moving through said opening in the lock channel when said flexible sheet is under tension load, said other concave surface forming a shallow detent surface for the lock bead member to permit releasing said lock bead member from the detent surface under small external upward forces applied thereto.

3,987,836

SCREEN PARTITION ASSEMBLY

Andre LeMay, Laval, Canada, assignor to Standard Desk Limited, Canada

Filed Feb. 19, 1975, Ser. No. 550,985
Int. Cl.² A47G 5/00
U.S. Cl. 160—135 **7 Claims**



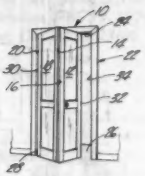
1. A modular screen partition system comprising:
column means capable of supporting a plurality of screen partitions comprising a column having hollow interior portions at each end thereof;
supporting means located within each of said interior portions;
said supporting means comprising plug means fixedly mounted within said column interior and a post coaxial with said column axis;
said plug means including a core; said post being substantially an extension of said core; and
at least one generally wedge-shaped member disposed within each of said interior portions;
said supporting means permitting angular rotation of said member while preventing axial movement of said member;
said member having a first edge disposed about said post and a second edge disposed about the hollow interior surface of said column; the edges of said member extending beyond the end of said column;
said member being provided with a threaded portion for fastening cooperation with a corresponding threaded element;
said threaded element comprising a bolt extending in a radial direction relative to said column axis through the first and second edges of said member;
said threaded element including an inner portion capable of contacting the surface of said post for locking said member against rotation about said post and an outer portion for cooperating with a partition to be joined to said column;
said threaded element including an outer portion including an enlarged head;
each partition to be joined to said column including a head-engaging slot disposed at the edge of said partition for engaging said threaded element head;
members at each end of said column means in paired relationship parallel to said column axis joining a partition to said column means through a respective head-engaging slot and a respective threaded element head.

3,987,837

BI-FOLD DOOR ASSEMBLY

Kenneth E. Hewson, 33905 Lamoyne, Livonia, Mich. 48154

Filed Sept. 16, 1974, Ser. No. 506,220
Int. Cl.² E05D 15/26
U.S. Cl. 160—206 **4 Claims**



1. A bi-fold door assembly adapted to be mounted in a doorway having opposing jambs and a header, said bi-fold door assembly comprising:
a jamb door;
a lead door;
means for hinging one lengthwise edge of said jamb door to one lengthwise edge of said lead door;
a header track having a U-shaped cross-section with a base having downwardly disposed legs;
the base of said track being attached to said door header such that said base extends from one of said door jambs, the opposing inner surfaces of said legs each having inwardly directed flanges formed thereon and extending the full length of said track, the upper surfaces of said flanges being spaced from said base a predetermined distance and the opposing edges of said flanges defining a slot;
means pivotably attaching a portion of said jamb door adjacent the other lengthwise edge thereof to said track at pivot point adjacent said one door jamb;
a pivot assembly carried by the upper surface of said lead door at a point adjacent the other lengthwise edge thereof, said pivot assembly having a stem member extending from said lead door through said slot and terminating in an enlarged head greater than said slot and slidably supported by the upper surfaces of said flanges.

said track flanges having a notched section for the passage of said enlarged head through said slot for said slidable support by said upper surfaces of said flanges, said notched section being spaced from said first-mentioned pivot point on said header track a distance which is greater than the distance between said pivot point and said pivot assembly when said doors are in a closed position;

First spring means carried by said header track at a position between said other door jamb and said pivot assembly;

second spring means carried by said header track between said first pivot point and said pivot assembly, said first and second spring means comprising a pair of spaced parallel end members each having a pair of aligned notches slidably receiving said flanges of said track and supported thereby, and

a pair of flexible members connecting the inner opposing surfaces of said spaced end members, said flexible members having a width less than said slot such that at least one of said members is expansible away from the other and through said slot when said end members are forced toward one another, said flexible members urging said end members away from each other.

3,987,838

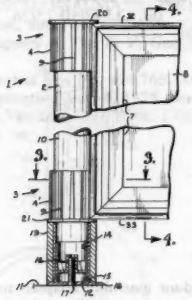
PARTITION SYSTEM

David H. LaGue, Shawnee Mission, Kans.; David A. Anderson, Kansas City, and Stephen R. Nichols, Kansas City (North), both of Mo., assignors to The Glen O'Brien Movable Partition Co., Inc., Kansas City, Mo.

Filed Aug. 4, 1975, Ser. No. 601,797

Int. Cl.² A47G *5/00*

U.S. Cl. 160—351 **11 Claims**



1. A partition system comprising:

a. at least two upstanding support structures with at least one having a support means on a lower end thereof for engagement with a support surface;

b. a mounting structure mounted on said one of said support structures, said mounting structure including

1. an upper tubular mounting member mounted on an upper end portion of said one of said support structures and adapted for longitudinal movement thereon;

2. a lower tubular mounting member mounted on the lower end portion of said one of said support structures and adapted for longitudinal movement thereon;

3. means retaining said upper and lower tubular mounting member in selected positions on said one support structure; and

4. and end flange extending outwardly from said lower mounting member and having one end portion of said edge member on the bottom edge portion of said panel in supported engagement thereon;

c. a plurality of longitudinally extending and circumferentially spaced ribs on said tubular mounting members, said ribs each having a pair of lugs extending laterally therefrom;

d. at least one panel having peripheral edge portions including opposite end edge portions and a top edge portion and a bottom edge portion, said panel having facia members each having an outwardly facing surface;

e. a plurality of elongated edge members each mounted on a respective one of said peripheral edge portions of said panel and each having flange portions thereof in engagement with the outwardly facing surface of a respective one of said facia members, said edge members each having opposite end portions; and

f. a pair of locking portions extending from one of said edge members and adapted for cooperative locking engagement with lugs of respective ribs of said mounting structure to thereby retain said panel on said one support structure.

3,987,839

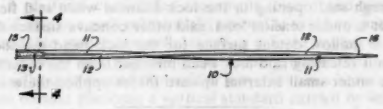
NEEDLE APPARATUS AND METHOD FOR MAKING NEEDLE APPARATUS

Robert K. Pace, 10206 Arvilla NE., Albuquerque, N. Mex. 87111

Filed Sept. 24, 1975, Ser. No. 616,505

Int. Cl.² B21G *1/00*

U.S. Cl. 163—5 **4 Claims**



1. A method of making a needle, comprising, in combination, the steps of:

selecting a pair of wires of substantially equal dimensions;

juxtaposing the wires of the pair against each other;

twisting the pair of juxtaposed wires between their respective ends; and

securing together the ends of the pair of wires.

3,987,840

METHOD AND APPARATUS FOR CONTINUOUSLY CASTING OF METAL IN HORIZONTAL DIRECTION

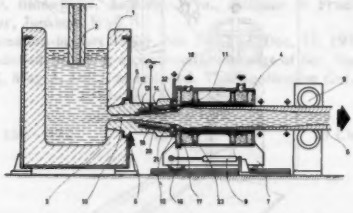
Jean-Pierre Birat, Metz, France, assignor to Institut de Recherches de la Siderurgie Francaise (IRSID), Saint-Germain-en-Laye, France

Filed Nov. 27, 1974, Ser. No. 527,866

Claims priority, application France, Nov. 28, 1973, 73.42268

Int. Cl.² B22D *11/00*

U.S. Cl. 164—49 **11 Claims**



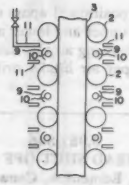
1. A method of continuously casting metal comprising the steps of continuously discharging a stream of molten metal from a container into a cooled substantially horizontally extending ingot mold open at opposite ends through a conduit of refractory material extending axially aligned with the ingot mold between an opening in a side wall of the container and one of the open ends of the ingot mold, and in which the flow passage formed by the inner surface of the conduit and that of the ingot mold abruptly increases at the junction of the conduit and the ingot mold; creating in the stream of metal pass-

ing through said conduit of refractory material upstream and adjacent said junction electromagnetic forces for producing in the peripheral zone of the stream of metal an acceleration substantially parallel to the inner surface of said conduit so as to form a liquid meniscus of stable configuration in the region of said junction; and continuously withdrawing the product formed in the ingot mold from the other end of the latter.

3,987,841
CONTINUOUS CASTING SYSTEM

Yasuo Itoh; Yoshitake Suzuki, both of Kisarazu; Hirohiko Shibutami, Kitakyushu; Koichi Hirano, Kitakyushu, and Muneo Tagami, Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo and Kabushiki Kaisha Yaskawa Denki Seisakusho, both of, Japan

Filed June 20, 1975, Ser. No. 588,698
Claims priority, application Japan, June 24, 1975, 49-71394
Int. Cl.² B22C *15/22*; B22D *11/12*
U.S. Cl. 164—158 **4 Claims**



1. A continuous casting system having rolls, which comprises

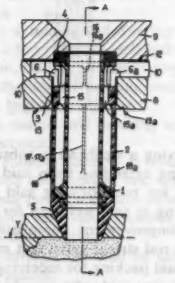
a. a foreign matter receiving gutter provided between two adjacent rolls for receiving foreign matter dropping, and

b. a foreign matter removing nozzle provided, at least, at one end of said foreign matter receiving gutter, said nozzle being directed to foreign matters dropped on said gutter so that pressurized fluid from said nozzle removes the foreign matters.

3,987,842
PLASTIC CORE BLOW NOZZLE WITH FASTENING HOOKS

Jacques André Chamdru, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault and Automobiles Peugeot, both of, France

Filed July 21, 1975, Ser. No. 597,333
Claims priority, application France, Aug. 2, 1974, 74.27000
Int. Cl.² B22C *15/24*
U.S. Cl. 164—200 **3 Claims**



1. A foundry core blow nozzle to be fitted on a filling tray having a cooling circuit, the filling tray being of the type used in a so-called hot-box process, said nozzle comprising:

a. a pair of plastic tubular sleeves including a male sleeve and a female sleeve concentrically assembled and providing an annular passageway therebetween, constituting a cooling jacket, for circulating cooling fluid, said male sleeve having a flange integrally formed thereon and carrying at a lower end a plastic nose piece to withstand heavy abrasive and thermal conditions;

b. a stud formed on said flange, said female sleeve having a notch on a bottom peripheral edge thereof, and said stud being engaged in said notch;

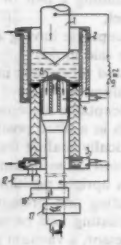
c. two pairs of fastening hooks integrallly formed on said female sleeve near an upper end thereof for snap action locking engagement into the cooling circuit of the filling tray; and

d. ribs formed integrally on one of said sleeves and extending into said passageway to provide a labyrinth for the circulation of the cooling fluid.

3,987,843
APPARATUS FOR MAKING INGOTS BY ELECTROSLAG REMELTING

Boris Evgenievich Paton, ul. Kotsjubinskogo, 9, kv. 21; Boris Izrailevich Medovar, Bulver Lesi Ukrainki, 2, kv. 8; Jury Vadimovich Latash, Vozdukhoflotsky prospekt. 87, kv. 14; Leonty Vasilievich Chekotilo, ulitsa Scherbakova, 49-a, kv. 10; Vitaly Mikhailovich Baglai, ulitsa Semashko, 10, kv. 54/3; Viktor Leonidovich Artamonov, ulitsa Sovetskaya, 9, kv. 4; Rodimir Ivanovich Garkaljuk, ulitsa Bolshaya, Kitaevskaya, 142, korpus 14, kv. 33; Viktor Anatolievich Timchenko, ulitsa Vladimirskaya, 98/3, kv. 36; Evgeny Fedorovich Malichenko, prospekt Entuziastov, 7/12, kv. 161; Leonid Mikhailovich Stupak, Brest-Litovsky prospekt, 39, kv. 9, and Rudolf Solomonovich Dubinsky, Brestlitovsky Prospekt, 11, kv. 15, all of Kiev, U.S.S.R.

Division of Ser. No. 341,938, March 16, 1973, which is a division of Ser. No. 124,836, March 16, 1971, abandoned, which is a division of Ser. No. 771,165, Oct. 28, 1968, abandoned. This application Sept. 19, 1974, Ser. No. 507,481
Int. Cl.² B22D *23/06*
U.S. Cl. 164—252 **4 Claims**



1. A device for electroslag remelting comprising a mold having a remelting zone defined by the lower portion thereof and adapted to retain a quantity of molten slag therein; a consumable metal electrode in contact with said slag bath; a bottom plate for supporting an ingot formed during melting; a source of electric power connecting said consumable electrode and said bottom plate with electrical leads connecting both of said mold and said bottom plate to the same potential; means for providing axial movement of said bottom plate relative to said mold during remelting; and means for controlling the axial movement of said consumable electrode during remelting.

3,987,844

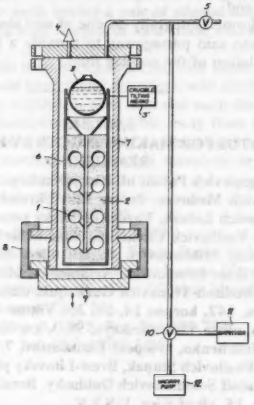
PRESSURE CASTING APPARATUS WITH HERMETICALLY SEALED HOUSING AND TILTABLE MELT-CONTAINING CRUCIBLE

Yordan Ivanov Vitanov; Boris Petrov Yordanov; Kalcho Minkov Mihovski, and Boris Yordanov Drakaliski, all of Sofia, Bulgaria, assignors to DSO "Metalurgia i Rudodobiv", Sofia, Bulgaria

Division of Ser. No. 469,305, May 13, 1974, abandoned. This application Mar. 13, 1975, Ser. No. 558,069

Int. Cl.² B22D *27/14, 27/16*

U.S. Cl. 164—256 **5 Claims**



1. A metal-casting apparatus, comprising:

an upright pressurizable housing open at its bottom;

an upright upwardly open container receivable in said housing;

a casting mold in a lower part of said container including a mold body having a multiplicity of casting cavities, a passage opening at the top of said mold body communicating with said cavities, and a funnel communicating with said passage;

said container including a pair of upright walls extending above said funnel;

a molten-metal receptacle having a mouth mounted in said container above said mold;

means mounting said receptacle in said container between said walls for tilting movement about a horizontal axis whereby said receptacle dispenses metal into said funnel from said mouth in a tilted position of said receptacle;

means for hermetically sealing the bottom of said housing upon the insertion of said container therein with said receptacle in an upright position; and

means for evacuating and pressurizing said housing, said means for evacuating and pressurizing said housing includes a compressor, a vacuum pump, a conduit communicating with said housing and a valve selectively connecting said compressor and said pump with said conduit, said housing including a flanged cover and said conduit opening into said housing on said cover.

3,987,845

AIR-COOLING TOWER

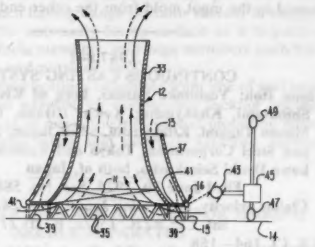
Robert Edward Potthoff, La Jolla, and Herman Peter Fay, Solana Beach, both of Calif., assignors to General Atomic Company, San Diego, Calif.

Filed Mar. 17, 1975, Ser. No. 558,698

Int. Cl.² B01F *3/04;* **F24H** *9/02*

U.S. Cl. 165—129 **7 Claims**

1. A cooling tower comprising, a heat exchanger, duct means defining a passage for directing air over said heat exchanger for cooling same, said duct means having an upper air intake orifice positioned a substantial distance above ground level and having a lower air intake orifice positioned substantially at ground level so that said upper and lower air intake



orifices are vertically positioned apart sufficient to make air available adjacent the upper and lower air intake orifices, and means for selectively drawing air into said duct means through either one of said upper air intake orifice or said lower air intake orifice.

3,987,846

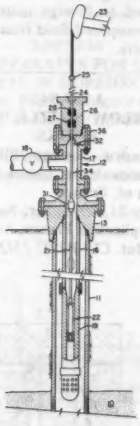
WELLHEAD SHUT-OFF VALVE

Dennis C. Thompson, Edmonton, Canada, assignor to Exxon Production Research Company, Houston, Tex.

Filed July 3, 1975, Ser. No. 592,845

Int. Cl.² E21B *43/00*

U.S. Cl. 166—84 **5 Claims**



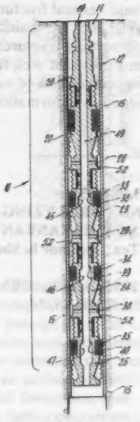
1. In a well having a wellhead, a subsurface reciprocating pump, a rod string extending from said pump through said wellhead, means for reciprocating said rod string and said pump, and packing in said wellhead for sealing around said rod string, the improvement comprising a valve member mounted on said rod string; valve seat means formed in said wellhead below said packing for receiving said valve member; and means for moving said valve member upwardly into sealing engagement with said valve seat means, said valve member being positioned on said rod string such that it does not contact said valve seat means during normal reciprocating operation of said rod string.

3,987,847

COMPOSITE MULTIPLE ZONE TEST TOOL

John A. Craig, Pointe-A-Pierre, Trinidad And Tobago, assignor to Texaco Trinidad, Inc., Pointe-A-Pierre, Trinidad And Tobago

Filed July 17, 1975, Ser. No. 596,704
Int. Cl.² E21B 33/122
U.S. Cl. 166—191 9 Claims



1. A composite multiple zone test tool for deep well operations, comprising in combination

a full bore test tool adapted for running into a well on a tubing string,

a plurality of full opening bridge plugs integrally attached in series below said test tool when in a well,

the lowermost of said bridge plugs being settable with a lowest differential pressure, and

a plurality of shear means for detaching said bridge plugs in sequence beginning with the lowermost first,

said lowermost shear means being sheared with a lowest amount of force.

3,987,848

PRESSURE-BALANCED WELL SERVICE VALVE

Robert Houston Canterbury, Hobbs, N. Mex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Mar. 6, 1975, Ser. No. 555,778
Int. Cl.² E21B 43/12
U.S. Cl. 166—224 A 4 Claims

1. A hydraulically actuated well treating valve for location in a tubing string in a low pressure well and for injecting fluids into a well formation, said valve comprising:

elongated generally tubular housing means adapted to be connected to a tubing string;

valve seat means inside said housing and having a flow passage therethrough;

a valve member slidably located in said housing and arranged for sealing abutment in said flow passage in said seat means in one position of said valve member;

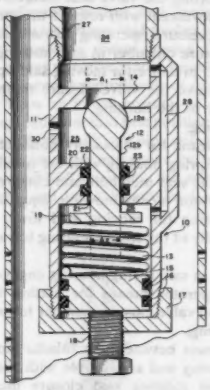
biasing means urging said valve member into abutment in said seat means flow passage;

flow exit means through the wall of said housing means below said seat means;

a first pressure response area on said valve member arranged to be exposed to fluid pressure in the tubing string through said flow passage in said seat means and further arranged to apply said pressure toward moving said valve member out of said seat means flow passage;

a second pressure response area on said valve member, of less cross-sectional area than said first pressure response area, and opposed to said first pressure response area;

seal means between said valve member and said housing, and located between said first and second pressure response areas; and,



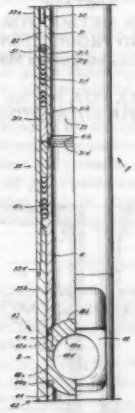
pressure bypass means arranged to continuously communicate fluidic pressure from the tubing string above said valve member to said second pressure response area around said seal means.

3,987,849

WELL TOOL

James D. Mott, Houston, Tex., assignor to Hydril Company

Continuation of Ser. No. 399,455, Sept. 21, 1973, abandoned, which is a division of Ser. No. 214,679, Jan. 3, 1972, Pat. No. 3,788,594. This application Apr. 9, 1975, Ser. No. 566,202
Int. Cl.² F16K 31/63; E21B 43/12
U.S. Cl. 166—224 A 2 Claims



1. A subsurface well safety valve including:

an elongate tubular valve housing having means for connecting it in a well flow conductor and having a bore therethrough in flow communication with the flow conductor for flow of fluids therethrough from the well formation;

a rotatable valve closure member having a transverse flow passage therethrough;

an upper seat member and a lower seat member above and below said valve closure member and engageable therewith for controlling flow through the valve closure member and the housing bore; and

means for supporting the valve seat members on the valve housing for movement with respect thereto including:

tubular fluid pressure operating piston means to provide a fluid pressure chamber in said housing for receiving control fluid pressure for moving said operating piston means to move the valve closure member longitudinally axially of the housing;

a spring housing;

connecting means for releasably connecting the upper end of the spring housing with the tubular valve housing above the seat members and closure member;

elongate operator means movable longitudinally in said spring housing for moving said lower seat member longitudinally of the spring housing toward said tubular housing;

spring means in said spring housing engageable with said elongate operator means for biasing the lower seat member and valve closure member toward said tubular valve housing;

actuating means between the tubular housing and the spring housing and engageable with the valve closure member for rotating said closure member about a transverse axis relative to the longitudinal axes of the housings for moving the closure member between open and closed positions;

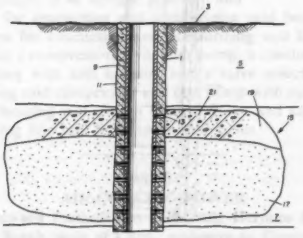
said connecting means connecting said spring housing with said tubular housing and providing openings disposed between said tubular housing and said spring housing in which the valve closure member, seat members, and actuating means are disposed, said openings permitting said closure member to have a transverse dimension substantially equal to the external diameter of the tubular housing, whereby the bore of flow passage through the valve closure member, through the tubular operating piston means, through the valve seat members and through the tubular housing may be a maximum in diameter.

3,987,850

WELL COMPLETION METHOD FOR CONTROLLING SAND PRODUCTION

John L. Fitch, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed June 13, 1975, Ser. No. 586,843
Int. Cl.[2] E21B *33/138, 43/26, 47/00*
U.S. Cl. 166—254 **6 Claims**



1. A method of completing a well that penetrates an unconsolidated hydrocarbon-bearing subterranean formation to control the production of formation particles therefrom, comprising the steps of:

a. injecting a fracturing fluid down said well and into said formation to form therein a vertical fracture that communicates with said well;

b. depositing propping material in said vertical fracture to form therein a propped portion of said vertical fracture and an overlying unpropped portion

c. logging said well to determine the upper location of said propped portion of said vertical fracture;

d. injecting a sealing material via said well into said vertical fracture above said propped portion thereof to seal said unpropped portion of said vertical fracture from communication with said well and to maintain intact said propped portion of said vertical fracture; and

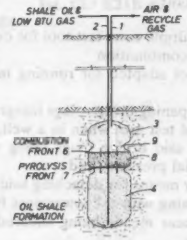
e. producing hydrocarbons into said well from said formation via said intact propped portion of said vertical fracture to control the production of formation particles from said formation.

3,987,851

SERIALLY BURNING AND PYROLYZING TO PRODUCE SHALE OIL FROM A SUBTERRANEAN OIL SHALE

Min Jack Tham, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed June 2, 1975, Ser. No. 583,123
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—256 **6 Claims**



1. In a process for producing shale oil from a subterranean oil shale formation that contains water-soluble material by forming a cavity within the oil shale formation, leaching water-soluble mineral to form a permeable oil shale rubble within the cavity, and circulating hot fluid through the cavity to pyrolyze the permeable oil shale rubble and recover shale oil, the improvement which comprises:

forming at least two cavities;

leaching water-soluble minerals by circulating aqueous liquid which is hotter than the surrounding oil shale through at least two cavities to form a relatively hot permeable oil shale rubble in each cavity;

initiating an underground combustion and advancing a combustion front through at least one cavity containing a permeable oil shale rubble or a pyrolyzed oil shale rubble that contains carbonaceous material;

circulating hot combustion products composed mainly of the oxides of carbon, hydrogen and nitrogen formed by said underground combustion through the permeable oil shale rubble in at least one of said cavities; and

recovering shale oil from at least one fluid produced from at least one of said cavities.

3,987,852

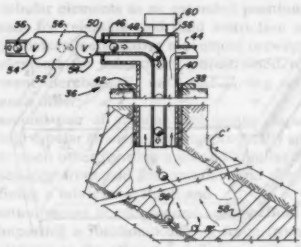
METHOD OF AND APPARATUS FOR IN SITU GASIFICATION OF COAL AND THE CAPTURE OF RESULTANT GENERATED HEAT

Ruel C. Terry, 1330 Gaylord, Denver, Colo. 80206

Division of Ser. No. 510,409, Sept. 30, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,561

Int. Cl.² E21B *43/24*

U.S. Cl. 166—261 4 Claims



1. A method of sustaining in situ gasification of an inclined coal formation comprising the steps of:

establishing a passage of fluid communication between a surface location and the sub-surface coal formation,

establishing an hermetic seal between the coal formation and the above surface ambient environment,

igniting the coal formation, and

depositing free falling containers of gasifying agents into the passage so that they will drop to the coal formation, said containers having melting points below the temperature of the burning coal formation, and

rupturing the containers with the heat in the formation to release the gasifying agents to sustain burning of the coal bed.

3,987,853

METHOD FOR INCREASING THE OIL RECOVERY FROM ACTIVE WATER DRIVE RESERVOIRS

Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.

Continuation of Ser. No. 183,911, Sept. 27, 1971. This application June 23, 1975, Ser. No. 589,095

The portion of the term of this patent subsequent to June 4, 1991, has been disclaimed.

Int. Cl.² E21B *43/24*

U.S. Cl. 166—272 5 Claims

1. A method whereby oil is produced from a subterranean oil reservoir having an active water drive and containing gas in solution which is penetrated by at least one injection well and the production well the improvements which comprise:

injecting a hot fluid into said reservoir via said injection well the hot fluid being at a temperature sufficient to liberate the dissolved gas from the oil in the reservoir and

simultaneously producing oil from the reservoir while injecting said hot fluid while the pressure in the reservoir remains essentially constant.

3,987,854

GRAVEL PACKING APPARATUS AND METHOD

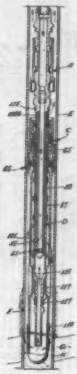
Rudy B. Callihan; Jerry W. Meyer, both of Houston; Clyde S. Wainwright, Jr., Bellaire, and Bobby B. Taylor, Houston, all of Tex., assignors to Baker Oil Tools, Inc., Houston, Tex.

Filed Feb. 17, 1972, Ser. No. 227,558

Int. Cl.² E21B *43/04, 43/10*

U.S. Cl. 166—278 23 Claims

1. In apparatus for use in a well bore and adapted to be run into the well bore on a pipe string for circulating a flushing fluid into and from the well bore in an initial direction and placing gravel in the well bore and for reverse circulating fluid placement of the gravel: said apparatus comprising a well liner; a packer assembly; means connecting said well liner to said packer assembly; and setting tool and crossover means releasably connected to said packer assembly and extending into said well liner; said packer assembly having means operable by said setting tool means expansible from a retracted position outwardly into sealing and anchoring engagement with the wall of the well bore; said packer assembly, said well liner, and said crossover means having flow passages and spaced sealing means selectively positionable upon movement of said crossover means longitudinally of said packer assembly and well liner from an initial position to a second position longitudinally spaced from said first position for directing fluid flowing downwardly through said pipe string into the well bore below said packer assembly and above the bottom of said well liner and from said well liner into the well bore above said packer assembly, and upon longitudinal movement of said



crossover means to a third position longitudinally spaced from said second position for directing fluid flowing downwardly through said well bore from above said packer assembly into said well liner below said packer assembly and from said liner below said packer assembly into said pipe string above said packer assembly.

22. An operating tool for setting a packer and screen in place in a well and establishing a circulation path through the packer and screen in place including: means for connecting said operating tool to said packer for setting the same in the well; means for establishing a flow path through the packer and screen to the exterior of the screen; means for establishing a circulation path through the packer and the screen downwardly from the surface and upwardly to return to the surface; means for closing off the circulation path; and means for opening the circulation path by rotational and longitudinal movement of an operating string connected to the operating tool.

3,987,855

LOST CIRCULATION CONTROL

Joseph U. Messenger, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,890

Int. Cl.² E21B *21/04, 33/13*

U.S. Cl. 166—294 9 Claims

1. In the drilling of a well having a drilling fluid therein, the method of treating said well to form a plug therein to control an active zone penetrated by said well, comprising the steps of:

forming a pumpable slurry of a light oil, a weighting agent, and an oil-wetting dispersing agent in an amount sufficient to cause said weighting agent to settle from said

slurry, said slurry having a density of at least about 18 pounds per gallon;

circulating a discrete amount of said slurry down a drill string positioned in said well and into said well in the vicinity of said active zone;

raising said drill string above said slurry; and

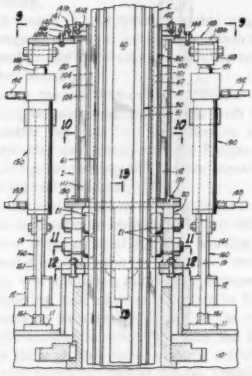
maintaining said slurry in said well in the vicinity of said active zone to form a plug of weighting agent in said well to control said active zone.

3,987,856

KELLY CROWD FOR VERTICAL DRILL RIG

Joseph A. Carl, Tucson, Ariz.; John F. Steinke, Fountain Valley, and David M. Bloss, Fullerton, both of Calif., assignors to Smith International, Inc., Newport Beach, Calif.

Filed Nov. 13, 1975, Ser. No. 631,443
Int. Cl.² E21B *3/04*, *7/02*
U.S. Cl. 173—149 **11 Claims**



8. In a vertical drilling machine, kelly crowd apparatus cimprising, in combination:

a drive kelly and inner and outer sleeves concentrically circumdisposed thereabout, said sleeves having first cooperably interengaging keyway means and said inner sleeve and drive kelly having second cooperably interengaging keyway means, whereby a rotating drive imparted to said outer sleeve will be imparted through said inner sleeve to said drive kelly;

means for supporting a drilling tool from the lower end of said drive kelly; and

separately controlled drive means for selectively lowering the elevation of said inner sleeve relative to said outer sleeve whereby a sliding friction force is imparted via said second keyway means and said drive kelly to said drilling tool so as to add to the gravitational force thereon.

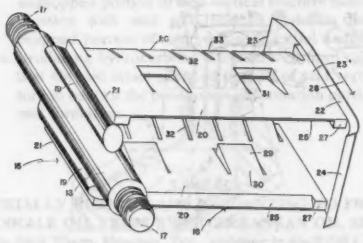
3,987,857

SIDE CUTTING DEVICE FOR EARTH BORING PROCEDURES

Stanley G. Atkins, Winnipeg, Canada, assignor to Armadillo Holdings Ltd., Winnipeg, Canada

Filed Apr. 18, 1975, Ser. No. 569,470
Int. Cl.² E21C *23/00*
U.S. Cl. 175—53 **13 Claims**

1. In a pilot hole boring assembly which includes a pilot hole forming pipe pushed through soil from one location to another location; a device for correcting deviation from a straight line of the hole formed by said boring assembly, said device comprising in combination an attaching portion adapted to be secured to said forming pipe in alignment therewith, means to secure said attaching portion to said forming pipe, and a cutter assembly extending from one side of said attaching portion, said cutter assembly including a hollow body and a cutter plate on the outer side of said hollow body, said cutter plate having a sharpened leading edge, and means on said hollow body to compress a plug of soil cut thereby when said device is moved through the soil in one direction and to facilitate extrusion of said plug of soil when said device is moved through the soil in the opposite direction, said hollow body including a pair of side plates secured by one end thereof one



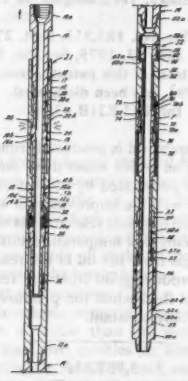
upon each side of said attaching portion and extending upon one side of said attaching portion in substantially spaced and parallel relationship one with the other, said cutter plate spanning the distal edges of said side plates, and being secured thereto, said attaching means, said cutter plate and side plates defining said hollow body, said plug of soil being cut by engagement of the leading edge of said cutter plate and part of the leading edges of said pair of side plates, with the wall of the hole formed by said boring assembly.

3,987,858

HYDROMECHANICAL DRILLING JAR

Damon T. Slator; Archie W. Peil, and Thomas R. Bishop, all of Houston, Tex., assignors to Bowen Tools, Inc.

Filed June 23, 1975, Ser. No. 589,058
Int. Cl.² E21B *1/10*
U.S. Cl. 175—297 **4 Claims**



1. A hydromechanical drilling jar adapted to be connected at one end to a drill string and at an opposite end to an object stuck in a well, said jar comprising:

a. a hydraulically operated jar section adapted to deliver an upward jarring blow to the object stuck in the well upon upward lifting of the drill string, said hydraulic jar section comprising:

inner and outer telescopically related tubular elements movable longitudinally relative to each other, said

tubular elements having telescopically overlapping portions providing an annular space therebetween;

jarring surfaces on said tubular elements for jarring contact with each other;

a first pair of annular seal means disposed between said tubular elements and longitudinally spaced relative to each other forming a first annular fluid chamber for confining a hydraulic operating fluid;

fluid restriction means in said first annular fluid chamber for restraining relative longitudinal movement of the tubular elements to an extended position;

means for releasing said fluid restriction means after a predetermined relative movement between said tubular elements for subsequent unrestrained relative movement therebetween until said jarring surfaces engage each other;

a second pair of annular seal means disposed between said tubular elements and longitudinally spaced relative to each other forming a second annular fluid chamber separate from said first annular fluid chamber for confining a lubricating fluid; and

rotation means in said second annular fluid chamber for imparting a rotational driving force from one tubular element to the other tubular element and for preventing relative rotational movement while permitting relative longitudinal movement between said tubular elements;

b. a mechanically operated jar section adapted to deliver a downward jarring blow to the object stuck in the well upon reverse lowering of the drill string;

c. means for connecting one of said jar sections to the drill string;

d. means for connecting the other of said jar section to the object stuck in the well; and

e. flexible tubular connection means releasably connected between said jar sections for connecting said jar tools to each other for lateral flexibility during the running of said jar in a well.

3,987,859

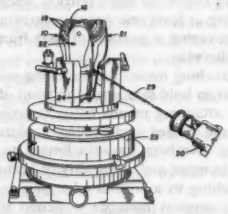
UNITIZED ROTARY ROCK BIT

Carl Laurent Lichte, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 409,207, Oct. 24, 1973, abandoned. This application May 15, 1975, Ser. No. 577,828

Int. Cl.[2] E21B *9/35*

U.S. Cl. 175—375 **9 Claims**



1. A rotary rock bit having an accurate gage diameter, comprising:

a multiplicity of segments each of said segments having faces with faces on each segment abutting faces on next adjacent segments,

said segments positioned together so that said abutting faces are out of alignment and not precisely coterminous thereby providing said rotary rock bit with an accurate gage diameter, and means fusing said segments together.

3,987,860

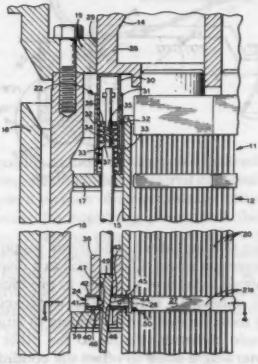
NUCLEAR REACTOR CORE STABILIZING ARRANGEMENT

Felix S. Jabsen, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.

Continuation of Ser. No. 823,305, May 9, 1969, abandoned. This application Sept. 19, 1973, Ser. No. 400,485

Int. Cl.[2] G21C *19/12*

U.S. Cl. 176—87 **7 Claims**



1. In a nuclear reactor having a core provided with a baffle plate enclosure, said core consisting of elongated fuel assemblies positioned in adjacent, parallel, laterally spaced apart relation to one another, said fuel assemblies each provided with a mid-point spacer grid having an outside band portion, the improvement of a device for use in stabilizing said core comprising:

former plate means mounted on the exterior of said enclosure,

a guide sleeve supported by said plate means, said guide sleeve having a longitudinal passageway of open-end construction,

a cylindrical sleeve passing through said guide sleeve transverse the axis of said passageway,

a cam rod having two end portions, one of said ends of said cam rod having two surfaces,

one an inclined surface and also a keyed surface both of which are provided in opposite directions on the end portion of said cam rod which passes longitudinally through said passageway of said guide sleeve and transversely through said cylindrical sleeve,

a key piece passing through said cylindrical sleeve and adapted to follow said keyway of said cam rod,

a wedge piece passing through said cylindrical sleeve and having an end adapted to follow said inclined surface of said cam rod,

said wedge piece having a second end passing through said enclosure and being provided with a platen for separable engagement to said outer band portion of said grid,

spring actuating means provided on the free end of said cam rod whereby downward pressure on said actuating means induces longitudinal movement of said cam rod which is translated into transverse movement of said wedge piece and pressure against said outer band surface of said grid.

3,987,861

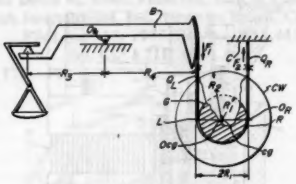
APPARATUS FOR NULLIFYING THE EFFECTS OF ANGULAR ACCELERATION OF FRAMES TILTABLY MOUNTING BALANCE BEAMS AND THE LIKE

James E. Smith, Boulder, Colo., assignor to Mettler Instrumente AG, Zurich, Switzerland

Continuation of Ser. No. 538,114, Jan. 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 472,660, May 3, 1944, abandoned. This application Sept. 12, 1975, Ser. No. 612,656

Int. Cl.² G01G 23/06, 1/26

U.S. Cl. 177—184 20 Claims



1. In a device that includes a rigid frame supporting a beam for tiltable movement about a horizontal axis displaced to one side of its centroid a distance effective to produce a condition of substantial imbalance therein, the improved means for counteracting those inertial forces tending to angularly accelerate one of said elements relative to the other which comprises: a counterweight sized to offset the condition of imbalance in the beam and restore same to an equilibrium position under static no-load conditions mounted upon the frame for tiltable movement about an instantaneous axis of rotation paralleling the axis of tiltable movement of the beam and spaced to one side of said counterweight's centroid a distance less than the radius of gyration of said counterweight; and, hanger means operatively connecting said beam and counterweight together for coordinated tiltable movement relative to one another and to the frame, the points of attachment of said hanger means to said counterweight and to said beam being spaced from their respective axes of pivotal movement distances effective to cooperate with the mass of said counterweight, the direction said counterweight tilts relative to the beam and the inertias of said beam and counterweight about their respective centroids so as to nullify substantially all relative motion between said beam and frame occasioned by inertial forces operative to bring about angular acceleration of the latter.

3,987,862

OFFSET AIR INTAKE HOOD

James E. Lidstone, St. Louis Park, Minn., assignor to Donaldson Company, Inc., Minneapolis, Minn.

Filed Sept. 25, 1974, Ser. No. 509,042

Int. Cl.² B60K 13/02

U.S. Cl. 180—54 A 6 Claims

1. In combination with a motor vehicle having a cab and an internal combustion engine:

a. an air inlet pipe extending vertically behind the cab, said inlet pipe having an outlet end positioned generally above and behind the cab;

b. an intake hood for said inlet pipe comprising a right angle conduit having a first branch directed forward above said cab, for exposure axially to air flow over said cab, and a second branch having a downwardly directed extremity which is connected to said inlet pipe so as to define therewith an annular chamber generally surrounding the outlet end of said inlet pipe, including means within said second branch and spaced from said extremity for supporting said right angle conduit on said end of said inlet pipe, and further including means for clamping said extremity of

said second branch to said inlet pipe; and

c. means for draining water from said annular chamber.

3,987,863

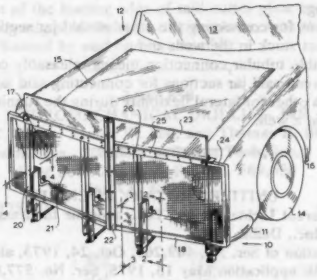
VEHICLE INSECT PROTECTION APPARATUS

Theodor H. Mittendorf, 601 N. McDonald St., Apt. 601, and William E. Keough, 969 W. 11th Ave., both of Mount Dora, Fla. 32757

Filed Dec. 29, 1975, Ser. No. 644,930

Int. Cl.² B60J 7/20

U.S. Cl. 180—68 P 8 Claims



1. An insect protection apparatus for moving vehicles comprising in combination:

frame means having a main portion and brace members extending below the main portion, each said brace member having at least one opening therein;

a screen covering a portion of said frame means and attached thereto;

bumper attaching means for attaching said frame means to a bumper to hold said screen in front of said vehicle, said bumper attaching means being removably connected to said frame means and having a plurality of top hook engaging members for attachment to a top edge of a vehicle bumper and a plurality of bottom hook members for attaching to a bottom edge of a vehicle bumper and a frame support member attached between each said hook member and one said bottom hook member, each said frame support member having openings therein and having spaced members for inserting one said frame means brace member;

a plurality of pins removably attachable through said openings in each said frame support member and in each frame means brace member for removing and locking said frame to said frame support member; and

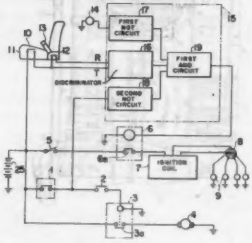
means for aligning said bumper attaching means to align said frame vertically in front of said bumper whereby a framed screen may be attached to the front bumper of a vehicle.

3,987,864

SAFETY DEVICES FOR MOTOR CARS

Tetsuya Iijima, Tokyo, and Toshio Shibuya, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed July 10, 1974, Ser. No. 487,022
Claims priority, application Japan, July 13, 1973, 48-79119
Int. Cl.² B60R 21/10
U.S. Cl. 180—82 C 3 Claims



1. A safety device for a motor car comprising:

a neutral switch connected in series with the starting circuit of the engine of the motor car and arranged to be closed when the speed change gear of the engine is maintained in the neutral or parking position;

a seat switch which is operated when a person sits on the seat of the motor car;

a safety switch which is operated when the person wears safety means;

connecting means for connecting said seat switch and safety switch with each other in series and for applying a voltage to one end of the series connection;

a flip-flop circuit having the reset terminal thereof connected to the other end of the series connection and the set terminal thereof connected through a third NOT gate circuit to the joint between said seat and safety switches;

a second AND gate circuit having one input terminal thereof connected to an output terminal of said flip flop circuit and another input terminal thereof connected to said joint between said seat and said safety switch;

an OR gate having one input terminal thereof connected to the other end of the series connection and another input terminal thereof connected to the output terminal of said second AND gate;

a second NOT gate circuit responsive to the condition of said speed change gear;

means for discriminating the stand still condition and the running condition of the motor car;

a first NOT gate circuit responsive to the output of said discriminating means;

a first AND gate circuit connected to provide a logical product of the outputs of said first and second NOT gate circuits and of said OR gate;

supplying means for supplying the output of said first AND gate circuit to said interlocking relay; and

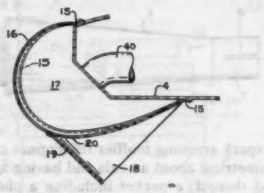
an interlocking relay connected in the ignition circuit of said engine and responsive to the output of said first AND gate circuit for enabling the person to start the engine when said speed change gear is maintained in its neutral or parking position and for enabling the person to operate the engine only when the seat switch and said safety switch are operated in a predetermined sequence while said speed change gear is maintained in its drive position.

3,987,865

GAS-CUSHION VEHICLE SKIRT

Carroll P. Krupp, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Mar. 19, 1975, Ser. No. 559,837
Int. Cl.² B60V 1/16
U.S. Cl. 180—127 10 Claims



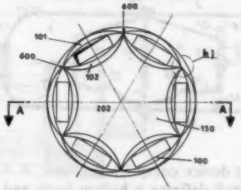
1. A gas-cushion vehicle having a skirt assembly, said skirt assembly having flexible fabric material cooperative with said vehicle to form a plenum chamber, means connected to said plenum chamber for supplying pressurized fluid thereto, a plurality of constraining means horizontally spaced and extending in vertical planes, each of said constraining means having their respective ends secured directly to said vehicle, and said constraining means being secured to said fabric material along its length to provide the primary load-bearing means for said skirt assembly.

3,987,866

GROUND-REACTION MACHINES

André Grihangne, 186, Avenue Victor Hugo, Paris (16°), France

Continuation of Ser. No. 241,029, April 4, 1972, abandoned.
This application June 4, 1974, Ser. No. 476,326
Claims priority, application France, Apr. 9, 1971, 69.12639
Int. Cl.² B60V 1/16
U.S. Cl. 180—128 6 Claims

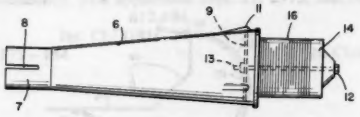


1. A flexible enclosure for enclosing a fluid cushion to support a ground-effect machine having a platform, said enclosure comprising a plurality of separate cells, each of which forms a peripheral support plenum cushion, connected in series and adapted to be attached at an upper attachment section thereof along the periphery of said platform and surrounding a single undivided chamber, each of said cells being bounded by two converging, intersecting flexible walls connected to the flexible walls of adjoining cells, the horizontal cross-sectional area of each of said cells decreases continuously from the upper attachment section at the periphery of said platform where air under pressure is fed to said cells, to a lower section thereof through which the air exits, the flexible walls of each of said cells are of bi-convex lenticular shape in horizontal cross-section throughout their height.

3,987,867
SPARK ARRESTING MUFFLER FOR ENGINES

Paul S. Moller, Dixon, Calif., assignor to Discojet Corporation, Davis, Calif.

Filed Mar. 26, 1975, Ser. No. 562,023
Int. Cl.² F01N 1/08
U.S. Cl. 181—56 1 Claim

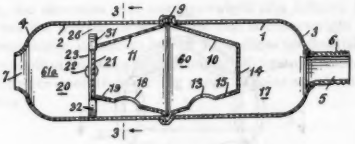


1. A spark arresting muffler for engines comprising a housing symmetrical about an axis and having an axial opening at one end thereof, a packet including a plurality of identical discs, each disc having a central opening therethrough, lugs on said discs constituted by integral axially directed edge deformations of said discs spaced apart around the periphery thereof and abutting adjacent discs in said packet and spacing said discs apart, an otherwise closed chamber having an axial opening, means for holding said packet with said discs in registry with each other along said axis and with all of said lugs disposed in the same axial direction and with one end of said packet against said end of said housing with the openings in said discs all in axial alignment with said housing opening and for holding said chamber against the other end of said packet with said axial chamber opening against and in axial communication with said openings in said discs for receiving and holding sparks from said housing opening rejected by said packet.

3,987,868
SILENCING DEVICE FOR INTERNAL COMBUSTION ENGINES

William M. Betts, 400 SW. 12th Ave., Pompano Beach, Fla. 33061

Continuation-in-part of Ser. No. 335,047, Feb. 23, 1971. This application Feb. 22, 1974, Ser. No. 445,031
Int. Cl.² F01N 1/08
U.S. Cl. 181—57 19 Claims



1. A silencing device comprising:

a. an outer shell defining a hollow body and including an inlet port and an outlet port,

b. at least one substantially conical element that has an open base, closed top, and is disposed within the hollow body to form at least one expansion chamber for exhaust gases passing through the shell,

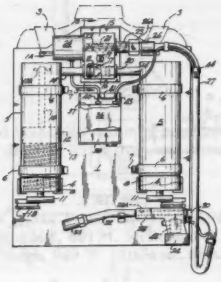
c. said conical element comprising a completely solid wall structure that is impermeable to exhaust gas and has a single, gas exhaust area for directing exhaust gases in one direction through the wall of the cone along only the cone-shaped, bottom portion thereof at a point laterally displaced with respect to said open base,

d. said open base being disposed between said exhaust opening and one of said inlet and outlet ports, said gas exhaust area being at least as large as the area of said inlet port to cause all of the exhaust gases which pass through said silencing device to move through said open base and said exhaust opening.

3,987,869
BACK PACK LUBRICATION SYSTEM

George Keith Bowers, 1533 Larkspur Ave., Eugene, Oreg. 97401

Filed Aug. 14, 1975, Ser. No. 604,552
Int. Cl.² F01M 11/04
U.S. Cl. 184—105 R 4 Claims



1. A back pack lubrication system comprising in combination,

a base adapted for transport on the back of an operator,

lubricant cylinders including conduit means for discharging cylinder carried lubricant,

means removably mounting said cylinders to said base,

lubricant pressuring means on said base including,

a motor in electrical circuit with a power source on said base,

lubricant pressurizing means driven by said motor,

a housing receiving lubricant from said cylinders and directing same to said pressurizing means,

said conduit means of the cylinders in detachable sealed engagement with said housing permitting cylinder disengagement for refilling purposes, and

a grease gun served by a hose in communication with said housing and including switch means in circuit with said motor for actuation by the operator to close the motor circuit to pressurize lubricant within said hose and gun.

3,987,870
MAST ASSEMBLY

Elias Wojtyna, Strongsville, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

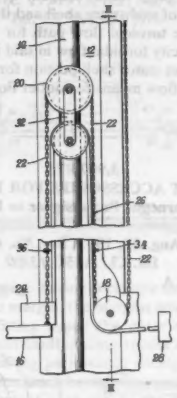
Filed Nov. 3, 1975, Ser. No. 628,684
Int. Cl.² B66B 9/20
U.S. Cl. 187—9 R 4 Claims

1. In a mast assembly having a mast, a piston cylinder elevating mechanism associated with said mast, a carriage connected to said piston cylinder elevating mechanism, a first sheave positioned at a first elevation, a second sheave positioned at a higher second elevation, a chain connected at one end to the carriage and extending under the first sheave and over the second sheave, a fluid actuated device carried by the cariage, and at least one resilient hose operably connected to the fluid actuated device, the improvement comprising:

a pulley connected to the second sheave and being positioned at a location immediately adjacent and beneath said second sheave; and

said hose extending under the first sheave, over the pulley, and to the fluid actuated device, said hose being in

contact with and overlying the chain on the first sheave with portions of said hose extending to and from said



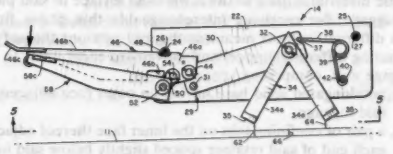
pulley being maintained by said pulley substantially adjacent and beneath said chain.

3,987,871

TROLLEY CART BRAKING SYSTEM

Robert A. Nordskog, Tarzana, Calif., assignor to Nordskog Company Inc., Van Nuys, Calif.

Filed Apr. 15, 1975, Ser. No. 568,273
Int. Cl.² B60T 1/14
U.S. Cl. 188—5 10 Claims



6. A braking device for a trolley cart which is normally rolled over a floor on wheels attached to the bottom of the cart comprising:

braking member attached to the bottom of said cart and extending downwardly towards the floor;

the end of said member comprising support means for engaging the floor; and

an over center linkage mechanism for moving said member between a non-braking position with said support means above the floor and a braking position with said support means engaging said floor; said support means being located in said non-braking position at a distance above the floor less than the total movement of said braking member produced by said linkage mechanism so that said cart is moved upwardly upon engagement of said support means with said floor during movement to said braking position, said support means thereafter resisting movement of the cart;

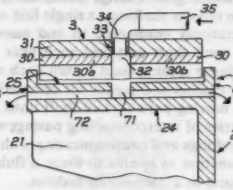
said braking member comprises a pair of angularly positioned legs connected together at their apex and pivotally mounted at their apex to said linkage mechanism by a pivot pin for rotation of said legs about said pivot pin, said support means comprising the opposite ends of said legs from said apex.

3,987,872

LIQUID COOLED, EXTERNALLY ENGAGING DRUM BRAKE

Jean Sabes, Anzin, France, assignor to Societe Anonyme dite: J. Sabes & Cie, Anzin, France

Filed Apr. 14, 1975, Ser. No. 567,824
Claims priority, application France, Apr. 16, 1974, 74.13240
Int. Cl.² F16D 65/80
U.S. Cl. 188—264 E 13 Claims



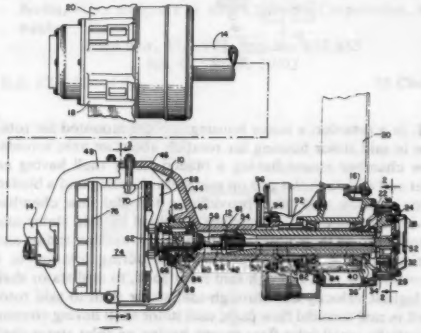
1. A drum brake provided with a cooling means and comprising a brake pulley comprising a rim having an outer friction surface, radial spokes and a hub, said brake pulley being mounted to rotate on an axis and being fast with a spindle connected to a member to be braked, such as a winch; a brake band having two ends and a friction lining surrounding the friction surface of the rim over an angle of more than 300°; a control lever articulated on a fixed point as well as at the two ends of the brake band; and a circuit for a cooling liquid connected to a source of pressurized liquid, said circuit comprising a multiplicity of transverse cooling channels extending axially through said rim and which open outwardly at at least one of the side faces of said rim, said circuit including a series of liquid conducting conduits extending radially inwardly from said rim's outer friction surface and communicating with said channels.

3,987,873

BRAKE MECHANISM

Antonio Lafuente Ruberte, Carretera de Valencia Km., Zaragoza, Spain

Filed Feb. 15, 1974, Ser. No. 442,846
Claims priority, application Spain, Aug. 29, 1973, 418320
Int. Cl.² H02K 49/04
U.S. Cl. 188—267 6 Claims



1. For use with opposing coaxially aligned vehicle wheels or the like, a brake mechanism comprising a housing located between such wheels, a stator mounted vertically within said housing and having opposing faces each containing a series of electrical windings, means for selectively actuating said windings, tubular shaftings extending in opposite directions from

and constituting lateral extensions of said housing and having inner and outer end portions, means for rotatably mounting wheels on the outer end portions, shaft units rotatably mounted within the shaftings and each shaft unit having inner and outer ends, rotor units supported on the inner ends of the shaft units for reaction to the electrical energization of the windings on the stator faces so as to thereby effect a braking of the shaft units, bearing support means arranged within the housing for the shaft units and disposed outwardly of the inner ends of such shaft units and the rotor units carried thereby, exteriorly arranged gear casings mounted on the outer end portions of the tubular shaftings, a single line epicycloidal gear assembly operatively connected to and associated with the outer end of each shaft unit and each gear assembly being housed in a planar arrangement within each of the exteriorly arranged gear casings and means for circulating a fluid lubricant over the moving parts of said shaft units, said last means including a series of interconnecting passageways provided in the tubular shaftings and communicating with the gear assemblies which function as pumps to force a fluid lubricant over the moving parts in a continuous fashion.

3,987,874

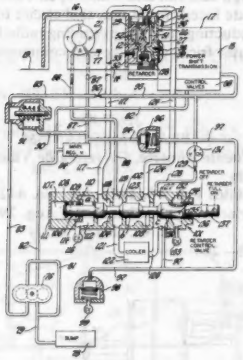
TRANSMISSION WITH RETARDER AND CONTROLS

Reece R. Fuehrer, Danville, and Richard B. Anderson, Indianapolis, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 345,725, March 28, 1973, abandoned. This application June 24, 1975, Ser. No. 589,908

Int. Cl.² F16D *57/04*

U.S. Cl. 188—296 **31 Claims**



1. In a retarder; a stator housing; a rotor mounted for rotation in said stator housing for rotation about an axis; toroidal flow chamber means having a bladed stator shell having an inlet end and an outlet end on said stator housing and a bladed rotor shell on said rotor providing a toroidal flow chamber having an outer toroidal surface provided by said stator and rotor shells at their normal outer toroidal section radius and perimeter; said rotor circulating fluid during rotation in a toroidal flow path through said rotor shell, to said stator shell at highest velocity and through said stator shell to said rotor shell in said toroidal flow path; said stator shell having circumferentially small inlet flow means having an inlet stator shell portion having inlet and outlet end perimeter portions having substantially the same toroidal section radius as like portions of said stator shell and an intermediate perimeter portion between said end perimeter portions having a larger toroidal section radius than the like portion of said stator shell and inlet passage portion means connected to said intermediate perimeter portion of said inlet stator shell portion for merging inlet flow with the high velocity toroidal flow in said inlet end perimeter portion between said inlet end perimeter portion and a central portion of said inlet stator shell portion with the central inlet flow path vector tangent to the outer toroidal section perimeter of said stator shell and the outer high speed flow vector of the toroidal flow path for merging inlet flow with the high velocity toroidal flow in said inlet end perimeter portion of said inlet stator shell portion for injection pumping action and outlet flow means for outlet flow from said chamber.

3,987,875

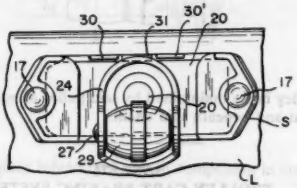
SUPPORT ACCESSORIES FOR LUGGAGE

Bela G. Szabo, Carnegie, Pa., assignor to Bruce Plastics, Inc., Pittsburgh, Pa.

Filed Aug. 29, 1975, Ser. No. 608,996

Int. Cl.² A45C *13/00*

U.S. Cl. 190—18 A **6 Claims**



1. In combination with a luggage unit adapted to rest on a surface in spaced relation thereto, a flat retainer of molded plastic material affixed to the lowermost surface of said piece of luggage, for receiving interchangeable thin plates fitted with different support means at the mid-portions thereof for imparting different support and movement capabilities to the luggage unit, comprising

a. an elongated solid base having an outer face adjacent to said luggage,

b. a pair of confining tabs on the inner face thereof adjacent each end of said retainer spaced slightly below said inner face and integrally molded with said retainer along the rear and side edges of the latter and provided with a slot at the front and above each of said confining tabs to define passages above the latter,

c. an elongated substantially rectangular plate detachably mounted on said retainer having the opposite ends thereof adapted to be inserted into said passages and to be maintained in resilient engagement between said inner face and the underlying confining tabs,

d. a pair of symmetrically disposed integral projections on the front edge of said inner face of lesser depth than said slots above said confining tabs, for providing a yieldable stop for the forward edge of said plate in its completely nested position in the passages above the confining tabs,

e. said projections being separated by a slot at the medial portion of said inner face for accommodating a spreading tool between said inner face of said retainer and said thin plate to effect relative movement therebetween in a transverse direction to an extent sufficient for the clearance of the said forward edge of said plate below said projections, and thereby to permit the withdrawal of said plate from said retainer, and

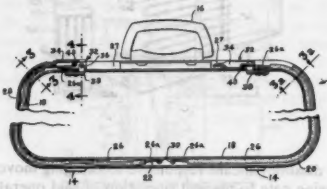
f. means connected at the mid-portion of said plate and projecting beyond the horizontal plane of said tabs for supporting the luggage unit thereby.

3,987,876

LUGGAGE CLOSURE

Jonathan Asa Foults, Wolcott, Conn., assignor to Scovill Manufacturing Company, Waterbury, Conn.

Filed Dec. 17, 1975, Ser. No. 641,541
Int. Cl.² A45C 13/10
U.S. Cl. 190—49 9 Claims



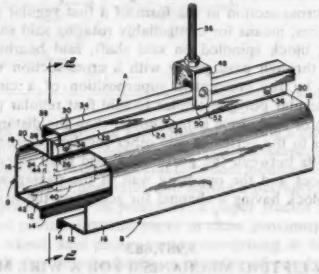
1. A piece of luggage having a closure defined by an inner margin and an outer margin, the margins adapted to close with the inner margin fitting inside the outer margin, the inner margin having an outwardly-facing recess along the margin, the outer margin having an inwardly-facing recess along the margin, one of the recesses having therein and there-along a flexible belt-like element anchored to the said margin at one point, belt-tightening means on the said margin operatively connected to the belt-like element at a second point spaced from said one point to move the belt-like element at second point selectively toward or away from the first point, whereby when margins of the closure are closed and the recesses juxtaposed, the belt-tightening means may be used to cause the belt-like element between the points to be disposed partly in each of the recesses to hold the closure closed, or, alternatively, to cause the belt-like element between the points to be disposed entirely in the recess of the said margin to permit the closure to be opened.

3,987,877

TROLLEY BUSWAY HOUSING

William J. Bulanchuk, Pelham, N.Y., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed May 2, 1975, Ser. No. 574,025
Int. Cl.² B60M 1/34
U.S. Cl. 191—23 A 7 Claims



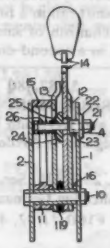
6. A trolley busway housing formed of a pair of housing parts reversely positioned and secured together, said housing having a generally T-shaped top portion formed by a generally vertical wall and a generally horizontally extending reversely bent flange portion on each said housing part, said reversely bent flange on each said housing part including a lower flange bent back upon itself to form an upper flange having an upper flange end extending inwardly beyond said wall, said housing parts being secured together with said upper flange ends substantially abutting one another and with said walls spaced-apart from one another, each said housing part having inside and outside surfaces and said pair of housing parts being reversely positioned by having said inside surfaces facing one another.

3,987,878

RANGE SHIFT AND PARK LOCK CONTROL

Kenneth N. Hansen, Waukesha, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Aug. 4, 1975, Ser. No. 601,844
Int. Cl.² F16D 67/00; B60K 29/02
U.S. Cl. 192—4 A 10 Claims



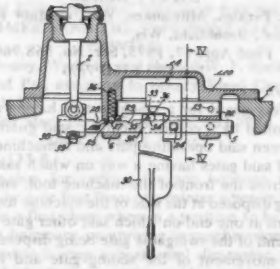
1. A park lock and range shift transmission control comprising, a control lever, a park lock wafer and a range shift wafer on opposing sides of said lever, a housing including, opposed side walls forming an elongated slot receiving said lever and said wafers, pivotal support means in said housing pivotally supporting said lever and said wafers, a park lock mechanism for operating a vehicle park lock in a transmission, a range shift mechanism for shifting a range shift in the transmission, means connecting said park lock wafer to said park lock mechanism, means connecting said range shift wafer to said range shift mechanism, radial tabs extending axially to form wear surfaces between said wafers and axially space said wafers to position said lever between said wafers, said tabs forming radial slots on each of said wafers for selectively and alternatively receiving said lever for selective and alternative rotation of one of each of said wafers for operation of said range shift and park lock wafers.

3,987,879

VEHICLE PARK-BRAKE AND GEAR SHIFTER WITH AN INTERLOCK

Donald W. Longshore, and Ferdynand Kolacz, both of New Berlin, Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 17, 1975, Ser. No. 632,855
Int. Cl.² B60K 29/02
U.S. Cl. 192—4 A 10 Claims



1. A vehicle park lock mechanism in a motor vehicle transmission comprising, a multiple speed transmission including, a shift lever pivotally mounted in the transmission, a shift rail

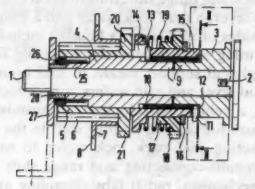
mounted for reciprocal movement in said transmission for selective movement by said shift lever, a detent means for selectively holding said shift rail in a gear shift position, a neutral position, and in a park lock position, a park lock carriage mounted on said shift rail for movement with said shift rail and for operating a park lock pawl lever to lock a braking gear, a gear shift fork slideably mounted on said shift rail, an interlock selectively locking said shift fork with said shift rail as said carriage engages said shift fork and said shift rail moves to and from the shift position, abutment means engaging said shift fork causing said interlock to disengage said shift fork from said shift rail as said shift rail moves to the park lock position to thereby selectively shift said transmission by movement of said shift rail in a first direction and to operate the park lock mechanism of said transmission by movement of said shift rail in a second direction.

3,987,880

WRAP AROUND SPRING CLUTCH

Gunter Holland-Letz, and Hermann Kohlhage, both of Paderborn, Germany, assignors to Nixdorf Computer AG, Paderborn, Germany

Filed Apr. 23, 1975, Ser. No. 570,770
Claims priority, application Germany, Apr. 24, 1974 2419848
Int. Cl.² F16D *41/02, 41/20, 67/02*
U.S. Cl. 192—12 BA **7 Claims**



1. A spring clutch for a step drive, such as for form feeds in office machines, comprising drive and driven hubs rotatable about a common axis and having respective axially adjacent parts surrounded by a coil torsion spring which, in an unstressed condition, has a diameter greater than that of the hub parts, the spring having one end anchored for rotation with the drive hub, and the other end coupled to a clutch actuating member through the intermediary of a slip clutch mechanism having a slip torque which is greater than the torque required to wind up the coil torsion spring onto the hub parts said slip clutch mechanism comprising two concentric sleeve elements surrounding the spring which elements are frictionally coupled by a pre-loaded compression spring acting therebetween.

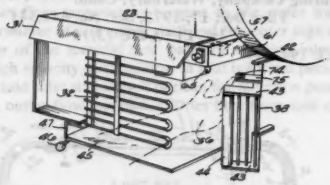
3,987,881

SAFETY GUARD

Harold W. Perkins, Milwaukee, Wis., assignor to Perkins & Mundt Inc., Brookfield, Wis.

Filed Apr. 17, 1975, Ser. No. 568,960
Int. Cl.² F16D *7/00*
U.S. Cl. 192—133 **13 Claims**

1. A safety guard for a machine tool having an operating part controlled by a control member, said guard comprising gates between said operating part and a machine tool operator, one of said gates having a way on which said one gate is slidable across the front of the machine tool, another of said gates being disposed at the side of the machine tool and having pivot means at one end on which said other gate is swingable, the other end of the swingable gate being disposed in the path of sliding movement of the sliding gate and being free to swing, whereby sliding movement of the sliding gate toward the swinging gate will push an intervening object against the free end of the swinging gate to thereby swing the swinging gate on its pivot means, said sliding gate having control member actuating means for normally actuating said control member at the end of its travel toward the swinging gate, thus to actuate the operating part of the machine tool, and control



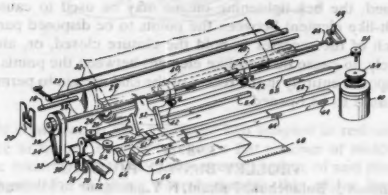
member disabling means responsive to swinging movement of the swinging gate to prevent operation of said operating part of the machine tool when such an intervening object is pushed by the sliding gate against the swinging gate.

3,987,882

PRINTER WITH HORIZONTALLY MOVABLE PRINT HEAD

Ronald J. Kobryn, Westwood, N.J., assignor to Computer Transceiver Systems, Inc., Paramus, N.J.

Filed Apr. 3, 1975, Ser. No. 564,752
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **4 Claims**



1. In a printer having a horizontal platen for supporting paper and having a print head which moves horizontally opposite the platen and is reciprocatingly driven toward said platen when printing a character, the improvement comprising: a shaft extending along a line parallel the platen and having a length substantially equal to the length of the platen, said shaft having a cross-section in the form of a first regular polygon with vertices; means for controllably rotating said shaft; and a bearing block spindled on said shaft, said bearing block having a through passageway with a cross-section which is delimited by the concentric superposition of a circle and another regular polygon similar to said first regular polygon, the radius of said circle being shorter than the distance from the center to the vertex of said other regular polygon so that a gap exists between the portions of said shaft intermediate said vertices and the opposing wall of the passageway, said bearing block having a channel for accepting the head.

3,987,883

RIBBON LIFTING MECHANISM FOR A WIRE MATRIX PRINTER

Daniel P. Darwin, Saratoga, Calif., and Donald K. Rex, Delray Beach, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

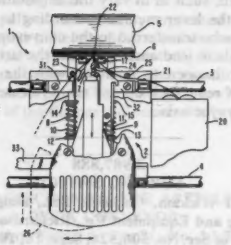
Filed Apr. 17, 1975, Ser. No. 568,961
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **6 Claims**

1. In a wire matrix printer having a movable printer carriage supporting thereon a plurality of print wires, a print head having a tip portion with openings through which the print

wires are reciprocally moved for printing, and ribbon held under tension in contact with the tip portion of the print head adjacent the openings and positioned to be engaged by the print wires as they reciprocate,

the combination with said carriage and print head,

a member having a portion thereof positioned adjacent to the print head wire openings and the ribbon,



means mounting the print head and member for relative movement on the carriage in a direction generally transverse to the plane of the ribbon where the ribbon contacts the wire openings of the tip portion of the head, and

means for producing relative movement of the print head and member to cause the member to engage the ribbon thereby separating the ribbon from the area of the wire openings on the print head.

3,987,884

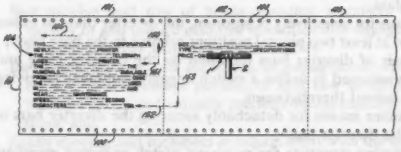
PRINTING APPARATUS WITH PAPER POSITIONING TRACTOR MEANS AND ESCAPEMENT MEANS

Edward J. Buxton, Summit, N.J., assignor to Edward J. Buxton, Summit, N.J.; Albert C. Nolte, Jr., Oyster Bay, N.Y. and Walter Hladky, Chatham, N.J., part interest to each

Continuation of Ser. No. 56,239, July 16, 1970, abandoned, which is a continuation of Ser. No. 845,602, June 30, 1969, abandoned, which is a continuation of Ser. No. 683,032, Nov. 14, 1967, abandoned, which is a continuation of Ser. No. 484,514, Sept. 25, 1965, abandoned. This application June 9, 1972, Ser. No. 261,452

Int. Cl.² B41J *1/32, 15/00*

U.S. Cl. 197—49 **21 Claims**



1. A high speed printing apparatus for printing a plurality of indicia onto a paper in response to a coded message, comprising a continuously rotating character wheel mounted at a fixed location within said apparatus and having a plurality of characters disposed along its periphery; a paper tractor for supporting and positioning said paper in close proximity to said character wheel, said paper tractor comprising at least one endless belt drive means having a plurality of evenly spaced sprocket pins disposed along its periphery adapted to engage said paper, a pair of spaced drive shafts rotatably mounted transversely to said belt drive means, and a carriage for supporting said belt drive means, said carriage being slidably coupled to said pair of spaced transverse drive shafts and said shafts being coupled to said belt drive means for providing rotation thereto; incremental feed means for successively indexing said tractor the length of one character space, said incremental feed means comprising a gear secured to one of said tractor drive shafts and means for advancing said gear to thereby advance said tractor the length of one character space; printing means including means for momentarily striking said paper toward said character wheel to effect printing engagement with one of said characters to print a corresponding indicia on said paper in response to said coded message when said paper is indexed; incremental shift means for moving said tractor transversely to the direction of said paper indexing to a position corresponding to the next line after a plurality of indicia have been printed, said incremental shift means comprising a rack secured to said carriage and a solenoid operatively connected to said rack for moving said rack and thereby said carriage the length of one line of type; and quick return means coupled to said paper tractor for positioning the margin of said paper in close proximity to said character wheel when said incremental shift means is actuated.

3,987,885

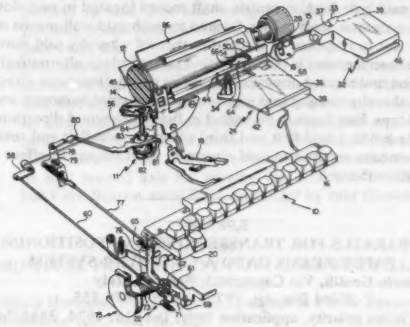
AUTOMATIC SINGLE AND REPEAT FUNCTION MECHANISM FOR TYPEWRITERS

Herrick R. Diamond, Homer, N.Y., assignor to SCM Corporation, New York, N.Y.

Filed June 23, 1975, Ser. No. 589,727

Int. Cl.² B41J *19/62, 33/02*

U.S. Cl. 197—91 **53 Claims**



1. In a typewriter which includes operational means for said typewriter to perform at least one typewriter function for causing the alignment of a selected platen impact point relative to the typewriter print point and having a platform for receiving a cartridge comprising:

means disposed in the typewriter and engageable by the cartridge for selectively either singly or repeatedly actuating said operational means upon a single insertion of the cartridge into the typewriter to thereby perform at least a selected one of said functions.

3,987,886

MECHANISM FOR VARYING THE GAP BETWEEN THE PRINT HAMMERS AND THE TYPE FONT FACES OF A PRINTER

Frank A. Mahoney, Wyncote, and Ronald W. F. Hutley, Lansdale, both of Pa., assignors to Sperry Rand Corporation, New York, N.Y.

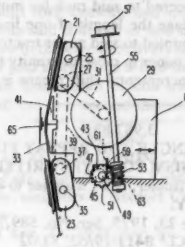
Filed Mar. 27, 1975, Ser. No. 562,702

Int. Cl.² B41J *15/00*

U.S. Cl. 197—133 R **3 Claims**

1. A mechanism for varying the gap between the print hammers and the type font faces of a printer wherein said type font faces lie in a first plane when in a position to be engaged with said print hammers, comprising in combination: a movable base member having a horizontal dimension, a depth dimension, and a vertical dimension, said movable base member formed to have a slot disposed along its horizontal dimension and extending the length thereof, said slot having first and second wall means, said movable base member disposed in a

second plane so that its horizontal dimension lies parallel to said first plane and its depth dimension lies perpendicular to said first plane; paper advancing tractor means disposed upon said base member to hold a paper record upon which printing is to be effected; print hammer means, having hammer faces, mounted on said base member to lie opposite the type font faces of a printer and disposed to have said hammer faces lie in a third plane which is parallel to said first plane and further disposed to have a gap formed between said print hammers



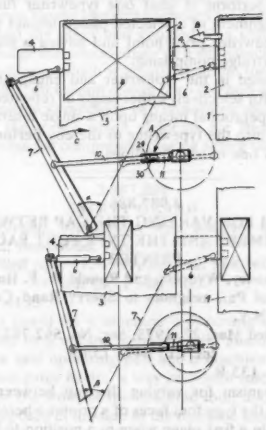
and said type font; eccentric shaft means located in said slot, said eccentric shaft means formed to push said wall means of said slot in response to a rotation thereof whereby said movable base member is pushed in said second plane alternatively in first and second directions along its depth dimension direction thereby causing said gap between said print hammers and said type font faces to be varied in first and second directions while holding said first and third planes in parallel; and rotation means secured to said eccentric shaft means to effect a rotation thereof.

3,987,887

APPARATUS FOR TRANSFERRING AND POSITIONING PAPER REAMS ONTO A CONVEYOR SYSTEM

Vittorio Gentili, Via Caprarie 3, Bologna, Italy

Filed Dec. 10, 1975, Ser. No. 639,555
Claims priority, application Italy, Dec. 13, 1974, 3565/74
Int. Cl.² B65G *47/00*
U.S. Cl. 198—486 **3 Claims**



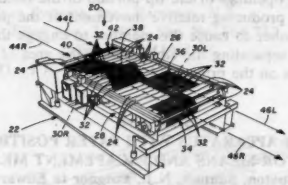
1. An apparatus for transferring and positioning paper reams onto a conveyor system, particularly onto the feed conveyor of paper ream wrapping machines, characterized in that it comprises a lever member hinged at one end and connected with its opposite end to a gripper assembly, a connecting rod member having its ends respectively mounted pivotally to said lever member and to one arm of a crank lever member actuated to impart to said lever member an oscillating movement between a stationary position whereat said gripper assembly picks up a ream from a supporting surface, and a position whereat said gripper assembly releases the ream onto a conveyor, a control means being provided for shifting the pivot point between said lever member and said crank lever member and the rotation axis of the crank lever member parallel to itself, such as to vary the amplitude of the oscillation angle of the lever member according to the size of the paper reams to be transferred to the conveyor and selectively cause said angle to lead and lag so that the stroke limits of the lever member happen to coincide with the fixed positions respectively of ream pick up and ream release along a predetermined conveyor axis.

3,987,888

SORTING SWITCH

Irwin Edward Wickam, Garland, Tex., assignor to Stewart Engineering and Equipment Co., Richardson, Tex.

Continuation of Ser. No. 506,524, Sept. 16, 1974, abandoned.
This application Feb. 2, 1976, Ser. No. 654,655
Int. Cl.² B65G *47/26*; A47B *11/00*; E01B *7/00*; F16M *13/00*
U.S. Cl. 198—802 **49 Claims**



27. In a sorting switch of the type adapted for use with pallets having switch engaging members, a switching apparatus comprising:

a base plate;

a diverter plate;

means for slidably supporting the diverter plate on the base plate;

means for securing the diverter plate to the base plate and for defining an axis of pivotal movement of the diverter plate;

means for selectively positioning the diverter plate in either of at least two pivotal positions relative to the base plate;

a pair of diverter bars mounted on the diverter plate and positioned to define a switch engaging member receiving channel therebetween;

fastener means for detachably securing the diverter bars to the diverter plate;

camming structure for receiving switch engaging members from the channel defined by the diverter bars on the diverter plate and for directing the switch engaging members along one of at least two predetermined paths depending on the pivotal positioning of the diverter plate.

36. For use in a sorting switch, a pallet comprising:

a relatively wide, substantially flat upper web;

a pair of flanges each depending from one edge of the web and extending along substantially the entire length thereof;

a pair of lips each extending inwardly from the lower edge of one of the flanges substantially parallel to the upper web;

said upper web, flanges and lips comprising a unitary body of plastic material;

said web, flanges and lips defining therewithin a pallet support member receiving zone;

means positioned within said pallet support member receiving zone and secured to the pallet for securing the pallet

in engagement with a pallet support member extending through the pallet receiving zone; and

a switch engaging member depending from the securing means.

44. A sorting switch including:

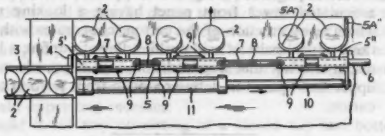
a plurality of channel-shaped pallet support members each comprising a relatively wide, substantially flat upper web and a pair of flanges depending from the opposite edges of the upper web; and

a plurality of pallets each slidably supported on one of the channel-shaped pallet support members and each comprising a relatively wide, substantially flat upper web, a pair of flanges depending from the opposite edges of the upper web, and a pair of lips extending inwardly from the lower edges of the flanges and substantially parallel to the upper web.

3,987,889
DISTRIBUTOR MECHANISM FOR ARTICLES COMING OFF A CONVEYOR

Aurora Nieto Godoy, Felipe de Paz St., No. 12,30, Barcelona, Spain

Continuation-in-part of Ser. No. 423,225, Dec. 10, 1973, abandoned. This application May 14, 1975, Ser. No. 577,168
Claims priority, application Spain, Dec. 18, 1972, 409751
Int. Cl.² B65G *47/26*
U.S. Cl. 198—456 **11 Claims**



10. A method of transferring bottles from a conveyor into individually predetermined, mutually spaced positions of the bottles, comprising;

collecting bottles delivered by a conveyor in a distribution zone as a row of bottles standing in mutually close positions;

providing a group of bottle-engaging members parallel to the row of collected bottles, initially disposing said members in positions opposite respective ones of the collected bottles;

first moving said row of bottle-engaging members transversely of and toward said row of bottles into engagement of each member with one of the bottles;

thereupon moving said members, in engagement with the bottles, in a direction parallel to said row to space the bottles apart in individually predetermined standing positions; and

finally moving said members in engagement with the spaced bottles, in movement transverse of said row for removal of the bottles from the distribution zone, while

holding the bottles against tumbling during the transverse movement.

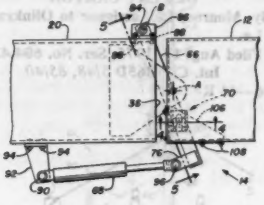
3,987,890
DIRECTIONAL CONTROL APPARATUS FOR A BALE THROWER

John H. Merritt, Ephrata, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Mar. 31, 1976, Ser. No. 672,369
Int. Cl.² B65G *31/02*
U.S. Cl. 198—316 **12 Claims**

1. An improved directional control apparatus for a bale thrower on a baler, said baler having a bale case with a bale discharge end, said bale thrower being mounted on said bale case at said discharge end thereof for lateral swinging movement relative to said bale case about a first axis and for receiving bales from said bale case discharge end and throwing them away from said baler, said improved directional control apparatus comprising:

an elongated arm pivotally mounted at one end portion about a second axis to said bale case being displaced from said first axis and located adjacent one side of said thrower, said arm extending generally transversely across said thrower to an opposite end portion located at an opposite side of said thrower;



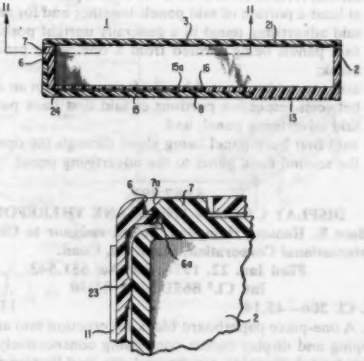
mechanism interconnecting said baler and said opposite end portion of said arm and being actuatable for causing pivoting of said arm about said second axis relative to said bale case; and

means mounted to one of said thrower and an intermediate portion of said arm and slidably connected to the other of said thrower and said intermediate arm portion such that an interconnection is established between said arm and said thrower which will cause said thrower to laterally swing about its said first axis as said arm is pivoted about its said second axis for varying the direction in which bales are thrown away from said baler by said thrower.

3,987,891
MOISTURE PROOF SAFETY CONTAINER FOR PILLS AND THE LIKE

William Horvath, Watchung, N.J., assignor to Plastic Research Products, Inc., Warren, N.J.

Filed July 7, 1975, Ser. No. 593,319
Int. Cl.² B65D *43/20, 55/02*
U.S. Cl. 206—1.5 **11 Claims**



1. A substantially rectangular container comprising in combination:

a cover having a rear wall and at least two side walls and open at the front,

a drawer constructed to move slidably into and out of the open front of said cover,

means for securing said drawer in latched relation with said cover comprising a window disposed in the back wall of said cover, and

a hooked tongue on the rear wall of said drawer constructed to fit into and substantially close said window, said hooked tongue having an edge portion constructed to engage a mating edge on said window in latching relation.

3,987,892

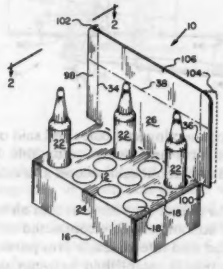
DISPLAY CARTON

Earl J. Killy, Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.

Filed Aug. 13, 1975, Ser. No. 604,420

Int. Cl.² B65D *5/48, 85/40*

U.S. Cl. 206—44 R **9 Claims**



1. A one piece display carton comprising

a. a generally rectangular box shaped product display section having formed therein a top panel, an intermediate panel and a bottom panel;

b. a front panel hingedly connecting said top panel to said bottom panel;

c. first and second folded back panels hingedly connecting said intermediate panel to said bottom panel, the first back panel being hinged on the bottom panel, the second back panel being hinged on the intermediate panel, and a portion of said first and second folded back panels extending above said top panel;

d. a generally upright advertising panel formed at the rear portion of said display section;

e. means, formed on at least a one of said panels, for locking at least a portion of said panels together and for retaining said advertising panel in a generally upright position;

f. said panels being formed from a one piece production blank;

g. said second back panel having formed therein an opening between respective portions of said first back panel and said advertising panel; and

h. said first back panel being glued through the opening in the second back panel to the advertising panel.

3,987,893

DISPLAY CARTON AND BLANK THEREFOR

Wallace E. Hanson, Hampden, Mass., assignor to Champion International Corporation, Stamford, Conn.

Filed Jan. 22, 1976, Ser. No. 651,543

Int. Cl.² B65D *5/50, 85/30*

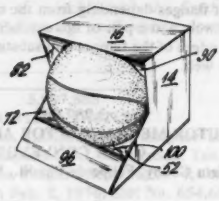
U.S. Cl. 206—45.14 **11 Claims**

1. A one-piece paperboard blank for erection into an article shipping and display carton comprising consecutively articulated glue tab, first side, top, second side, and bottom panels,

said top and bottom panels each having two opposed ends, with said top and bottom panels each including curved back panels respectively articulated to one end thereof, while said first and second side panels include lock tab panels, with said curved back panels and said lock tab panels being interconnected by intermediate articulated webbed corners which are bent inwardly upon erection of the carton to define an open back portion of the carton wherein the edge portions of said curved back panels engage said article;

said top panel further including, at the opposite end thereof, an articulated upper front panel which is concavely curved with respect to said top panel;

said first and second side panels having two opposed ends, with said first and second side panels each including, at



one end thereof, articulated pairs of cushion flaps which are bent inwardly upon erection of the carton and include curved edges for engaging said article; and

said bottom panel including, at the opposite end thereof, an articulated lower front panel having a locking panel which upon erection of the carton, cooperates with portions of said pairs of said cushion flaps to define a lower display surface that is spaced from said concavely curved upper front panel to define an open front portion of the carton.

3,987,894

PRESENTATION CASKET

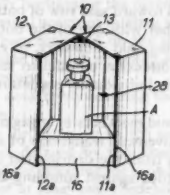
Georgy Bidegain, Pau (Pyrenees Atlantiques), France, assignor to E M B A D A C, Morlaas (Pyrenees Atlantiques), France

Filed Mar. 19, 1975, Ser. No. 559,711

Claims priority, application France, Apr. 12, 1974, 74.12913

Int. Cl.² B65D *5/50*

U.S. Cl. 206—45.15 **5 Claims**



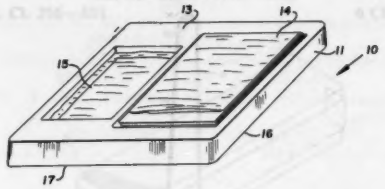
1. A presentation casket comprising a casing formed by two shells articulated on each other along a rear vertical axis so as to be adapted to open at the front from a closed position, a base disposed in the interior and at the bottom of said casing and adapted to receive an article to be presented, a folded flap having a central portion fixed to said base and having two end portions fixed respectively to the two shells and having two free intermediate portions forming respectively two bellows members elastically coupling the base to the shells to apply a thrust against the base in a symmetrical manner with respect to the shells.

3,987,895

DISPOSABLE LIVER BIOPSY TRAY

Khosrow Jamshidi, 610 Winston Court, St. Paul, Minn. 55118

Continuation of Ser. No. 460,218, April 11, 1974, abandoned.
This application Oct. 6, 1975, Ser. No. 619,673
Int. Cl.² B65D 1/34
U.S. Cl. 206—72 4 Claims



1. Biopsy tray means for sequentially conducting sterile procedures and comprising, in combination, upper and lower nested tray members retaining means for performing biopsy techniques in a sterile field:

a. said upper tray consisting of a closed top and open bottom structure having a generally planar top surface with outwardly flaring depending flanges extending as a continuum about the periphery thereof and forming a base support, a plurality of article supporting recesses formed within said generally planar top surface of said upper tray member and having the edge surfaces thereof extending integrally as a continuum about the base surface of each of said recesses, and article means for preparing a sterile zone upon the body of a patient releasably retained within said upper tray recesses;

b. said lower tray consisting of a closed top and bottom structure having a generally planar top surface with outwardly flaring depending flanges extending as a continuum about the periphery thereof and forming a base support for said lower tray member, a plurality of article supporting recesses formed in said generally planar top surface of said lower tray member and having the edge surfaces thereof extending integrally as a continuum about the base surface of each of said recesses, and collective apparatus for performing the specific operations of the biopsy procedure upon the body of a patient, said collective apparatus being releasably retained within said lower tray recesses;

c. the inner surfaces of the outwardly flaring depending flanges of said upper tray member generally enveloping and sealingly engaging the outer surfaces of the outwardly flaring depending flanges of said lower tray member along an extended portion of the depending flange surface so as to generally confine and conceal the upper surface of said lower tray member and the articles supported thereby from the ambient.

3,987,896

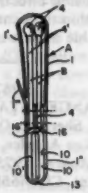
MATCH CONTAINER

Dennis R. Thompson, Apt. 1803, 8 Charles Plaza, Baltimore, Md. 21201

Filed May 20, 1975, Ser. No. 579,270
Int. Cl.² A24F 27/00
U.S. Cl. 206—109 1 Claim

1. A combination match container and striking element in which the match container is in the form of a flexible cover sheet wherein the cover is folded upon itself to provide a back portion and a frontal portion, means for securing the base of a book of matches to the back portion of the sheet, the end of the sheet adjacent the base of the match book being looped outwardly from the base of the match book of such size as to receive a molded striking element, the improvement comprising:

a. a match striking element comprising a foldable molded sheet when folded is of rectangular shape having parallel side portions forming a pocket between the side portions, said match striking element being closed along its top, bottom and one end, the opposite end of the folded sheet having an elongated slot from top to bottom thereof and of such width as to allow free passage of a match head therethrough, the sidewalls of the sheet adjacent the opening being substantially rigid, the remainder of the sidewalls of the sheet being substantially thinner than the



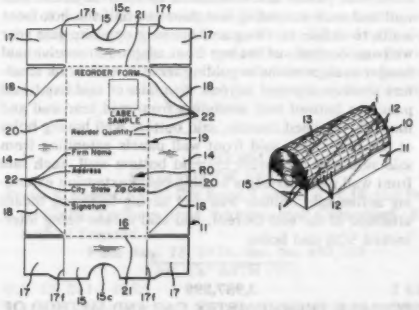
portion of the sidewall adjacent the opening to make the thin portion of the walls compressible to engage the match head when the match head is passed through the opening to the area between the thin and flexible central portion of the pocket, the inner surfaces of the thinner and flexible sidewalls being provided with a match striking substance whereby the match is ignited when the sidewalls of the thinner portion of the pocket are pressed in contact with the match head and the match head withdrawn from the area between the flexible sidewall portions.

3,987,897

LABEL ROLL PACKAGE

Thomas M. Smith, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Apr. 7, 1975, Ser. No. 566,001
Int. Cl.² B65D 79/00, 75/54, 85/672
U.S. Cl. 206—226 7 Claims



1. A label roll package, comprising: a tray including a pair of opposite side panels and a pair of opposite end panels extending upwardly from a bottom panel, a plurality of side-by-side rolls of labels received in the tray, the spacing between the side panels being substantially equal to the diameter of the label rolls, the height of the side panels being less than the diameter of the label rolls so that the label rolls extend above

the side panels, the label rolls having generally aligned corresponding center holes, a container disposed in the center space defined by the center holes and enclosing an inking member, at least one of the end panels of the tray defining an opening aligned generally with the center holes for inserting the container and the inking member into the center space of the label rolls after the rolls are placed within the tray, a plastic film material shrink-wrapped about and substantially enclosing the tray and the rolls and exerting pressure against the tray and the label rolls to provide a unitized package, and the film material being effective to retain the container and inking member within the center space and being sufficiently transparent to enable indicia on the labels to be read.

3,987,898

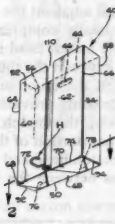
HANGER STACKING RACK

Walton B. Crane, Sherman Oaks, Calif., assignor to A & E Allied Plastics, Los Angeles, Calif.

Filed Aug. 4, 1975, Ser. No. 601,413

Int. Cl.² B65D *5/02, 85/00*

U.S. Cl. 206—300 **10 Claims**



1. Knock-down racking box for storage of clothes hangers of the type having right and left arm portions and an outwardly projecting neck portion therebetween carrying hook structure, said box comprising

a unitary sheet material blank folded along predetermined lines into an elongated, generally rectangular configuration of a size to receive a series of said hangers in horizontally disposed and vertically aligned relation,

said box configuration being defined by: a rear wall, opposed side walls fold-connected to said rear wall and of less than one-half the rear wall width, left- and right-hand front wall panels fold-connected to their adjacent side wall and each extending less than one-half the box front width to define an elongated opening opposite said rear wall and centrally of the box front adapted to receive said hanger neck portions in guiding relation with hook structure thereon exposed beyond the plane of said front wall panels, a bottom wall extending from said rear wall and hingedly attached thereto, said bottom wall having holes at the hinge line, said front wall panels extending from said side wall and overlying said bottom wall, each said front wall panel having a locking panel extension extending across said bottom wall and having fastening means attached at the end thereof, and said means being interlocked with said holes.

3,987,899

DISPOSABLE THERMOMETER CAP AND METHOD OF MAKING SAME

Emil Vyprachticky, Arvada, Colo., assignor to Edwin L. Spangler, Jr., Denver, Colo., a part interest

Filed Apr. 25, 1975, Ser. No. 571,522

Int. Cl.² B65D *85/20*; G01K *1/08*

U.S. Cl. 206—306 **9 Claims**

1. The improved protective cover for the probe of an electronic thermometer of the type having a heat-responsive element in the tip thereof which comprises: a rigid tubular element closed at one end to form a cap, the size of said tube being greater than that of the probe in the area of the tip so as to leave an annular space therebetween, the closed end of said cap having a central thin walled area surrounded by a relatively thicker marginal area bordering same, the interior surface of said marginal area having at least three integrally-

formed ribs arranged in angularly-spaced relation and radiating from said thin central area, said ribs being positioned and adapted to cooperate with one another to maintain the probe centered within the tubular element and said thin walled center section in heat conductive contact with the heat-responsive element.

3,987,900

JACKET FOR MAGNETIC DISC MEMORY

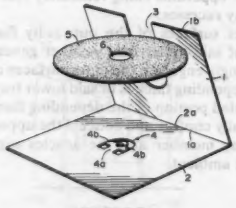
Eiichi Tadokoro; Akira Ishii; Tatsuji Kitamoto, and Osamu Suzuki, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 22, 1975, Ser. No. 606,786

Claims priority, application Japan, Aug. 23, 1974, 49-101770

Int. Cl.² B65D *85/30*

U.S. Cl. 206—313 **4 Claims**



1. A jacket for retaining a magnetic disc memory comprising a cover sheet of substantially square shape, and a base sheet of substantially the same size and shape as that of said cover sheet and hinged at an edge thereof to an edge of said cover sheet, said cover sheet having a cut-away portion extending from an edge thereof opposite to said hinged edge to the central part thereof, the width of said cut-away portion being not less than the diameter of a central hole of said magnetic disc, said base sheet having at the central part thereof a disc holding portion, said disc holding portion comprising a stem portion and a plurality of engaging portions connected with said stem portion, said engaging portions being engageable with said central hole of the magnetic disc.

3,987,901

STACKED LABEL PACKAGE AND METHOD OF MAKING IT

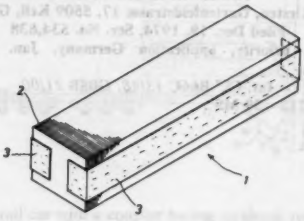
Karl Dullinger, Neutraubling, Germany, assignor to Hermann Kronseder, Worth (Danube), Germany

Filed Nov. 7, 1974, Ser. No. 521,988

Claims priority, application Germany, Nov. 24, 1973, 2358579; July 10, 1974, 23388

Int. Cl.² B65D 71/02, 85/62

U.S. Cl. 206—451 6 Claims



1. A unitary label package comprising a continuous stack of several thousand identical individual labels and at least two adhesive tapes extending lengthwise of said stack whereby said individual labels are tied into stable transport and refill unit which is directly insertable into the magazine of a labeling machine, said tapes being adhered along opposite sides of the stack and around the end faces thereof, said tapes being under tension whereby to exert contracting pressure upon the stack, said tapes having an adhesive coating facing the stack in which the cohesion of the coating to the tapes is greater than the adhesion of the coating to the stack so that substantially none of the coating remains on the stack after the tapes have been peeled off the stack.

3,987,902

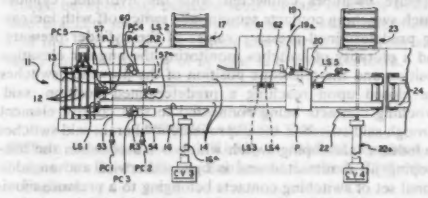
PACKAGE INSPECTION APPARATUS

Billy Burgess, 5770 Hollybrook Lane, Sylvania, Ohio 43560; Washington I. McGilvery, 11175 West St., Whitehouse, Ohio 43571; John R. Michael, 439 N. River Road, Waterville, Ohio 43566; Robert P. Snyder, 5669 Dornell Drive, Sylvania, Ohio 43560; John Henry Burgess, deceased, late of Sylvania, Ohio, by Norma Lou Burgess, administratix, 5663 Dornell Drive, Sylvania, Ohio 43560

Filed May 31, 1974, Ser. No. 474,958

Int. Cl.² B07C 5/342

U.S. Cl. 209—75 8 Claims



1. A combination of electrically actuated and electrically connected elements adapted to monitor a sequence of wrapped articles moving in a path, certain of said elements being located in said path for actuation by said moving articles and serving to effect rejection of certain miswrapped articles from said path, said combination including a first limit switch (LS1) positioned in said path for actuation by an article, a first photocell and light source combination (PC1) located to project an interruptable first beam across said path, a relay (CR1), a plurality of switches (66 and 69) controlled by said relay, a first control valve (CV1) regulating a movable gate intermittently intercepting said path and which controls movement of articles, a second control valve (CV2) regulating intermittent flow of air against said wrapped articles, a switch (64) which closes upon actuation of said first photocell (PC1) by a light source to actuate control valve (CV1) to open said gate valve, a switch (64a) which closes when light directed at photocell (PC1) is interrupted by an article to actuate valve (CV2), at least one additional auxiliary photocell and cooperating light source combination (PC2) located to project an interruptable second beam proximate the perimeter of an article to detect miswrapped articles, a control relay (CR2), a normally open switch (76) controlled by said auxiliary photocell, a second limit switch (LS2) positioned in said path for actuation by a moving article, a third control relay (CR3), a plurality of switches whose open or closed position is controlled by control relay (CR3), a reject valve (CV3) controlling a reciprocable push rod located to move an article out of said path and a plurality of wire conductor means connecting the above-recited elements to each other and to a source of electrical current in the manner illustrated in FIG. 11.

3,987,903

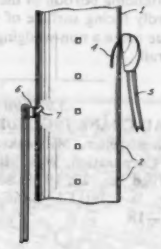
TIE RACK

Robert L. Swilley, 1700 Seaspray Court, Apt. 1043, Houston, Tex. 77008

Filed July 28, 1975, Ser. No. 599,944

Int. Cl.² A47F 5/08

U.S. Cl. 211—13 2 Claims



2. In a tie rack, a body member having a suspension means at one end and a series of longitudinal rows of square openings, a four-in-hand tie holder having a substantially U-shaped horizontal bar, a projection thereon adapted to be mounted in one of said square openings, said projection extending laterally and upwardly from said bar and being formed to fit closely within said openings, said projection extending outwardly from said bar at the bottom thereof, forming a seat for one of said openings in said rack, and the upper face thereof extending outwardly and upwardly from said bar.

3,987,904

STORAGE OF ARTICLES

Frank S. Height, 6A W. Hill Road, London, S.W.18, and Frank S. Guille, Treasury Oast, Ickham, near Canterbury, Kent, both of England

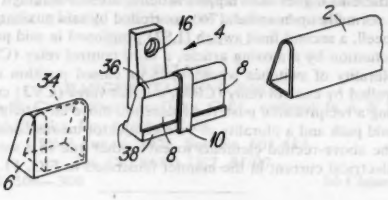
Filed Aug. 15, 1974, Ser. No. 497,715

Int. Cl.² A47H 1/02

U.S. Cl. 211—105.1 1 Claim

1. A rail, for fixing in a horizontal attitude so as to support articles having an end wall and a tongue extending rearwardly and downwardly from the end wall, including: lengths of tube and mounting members, the lengths of tube having a continuous circumferential wall and being of uniform cross section with substantially flat front and rear faces which converge upward slightly towards each other and a rounded top, and each mounting member including a pair of oppositely directed spigots for engaging in the adjacent ends of lengths of tube, each spigot having a transverse cross section which is substan-

tially that of an isosceles triangle with the smallest angle rounded, and means, at the junction of the spigots, for aiding in affixing the member to a wall or the like, the junction between the spigots of each mounting member being constituted by a collar having an upper part whose cross section is substantially the same shape as the corresponding part of the spigots, and is larger than the cross section of the corresponding part of the spigots by an uniform amount so that said lengths of tube and said collar form a rail having an uniform upper surface, the front face of said collar being flat and



extending substantially parallel to the vertical when the rail is in use, and said affixing means being integral with and extending rearwardly from a lower portion of said collar so that articles can be moved along said rail constituted by said lengths of tube and said mounting members, said rail receiving the tongue of a said article supported thereon such that the rearwardly extending portion of the tongue of the article rests on the upwardly facing surface of the rail, and the rear wall and the tongue make a non-wedging fit with the front and rear faces of the rail.

3,987,905

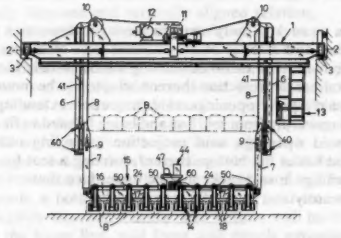
OVERHEAD CRANE INCLUDING GRAPPLE MEANS

Max J. Dechantsreiter, Milwaukee, Wis., assignor to Harnischfeger Corporation, West Milwaukee, Wis.

Filed Jan. 27, 1975, Ser. No. 544,231

Int. Cl.² B66C 17/00

U.S. Cl. 212—18 **5 Claims**



1. An overhead crane having telescoping mast means extending downwardly and terminating in vertically moveable lower extensions, and a horizontally extending frame member carried by the lower extensions for vertical positioning therewith, a plurality of clamping arms pivotably supported by said frame member and spaced along opposite sides of said frame member to define a plurality of opposed pairs of clamping arms, each of said opposed pairs for engaging a load therebetween, and drive means for forcing the lower ends of each pair of opposed clamping arms in a directon to clampingly engage a load located between said opposed arms and for releasably locking each pair of opposed clamping arms in clamping engagement with the load therebetween, said drive means including a rotatably driven shaft rotatably supported by said frame member, a plurality of linkage members, each of said linkage members operably connecting said driven shaft and one of said clamping arms, said each of said linkage members having opposite ends, one of said ends being connected to said driven shaft off-center thereof and the other of said ends being shiftably connected to one of said clamping arms, and spring means between said each of said linkage members and said one of said clamping arms.

3,987,906

APPARATUS FOR PREVENTING THE TILTING OF TELESCOPIC JIB CRANES

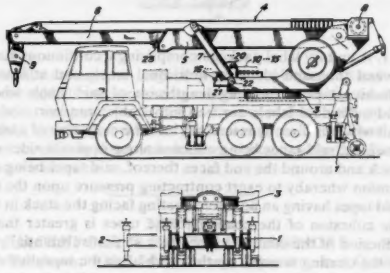
Erhard Kirsten, Gartenfeldstrasse 17, 5509 Kell, Germany

Filed Dec. 19, 1974, Ser. No. 534,638

Claims priority, application Germany, Jan. 4, 1974, 2400310

Int. Cl.² B66C 13/48; G08B 21/00

U.S. Cl. 212—39 MS **2 Claims**



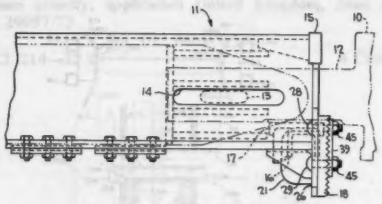
1. An overload prevention system for preventing tilting of a telescopic jib crane in which a hydraulic cylinder is provided for raising the jib, said system comprising an electric power supply, a control element arranged to terminate crane operation when deenergized and a steady-current circuit for connecting said control element to said electric power supply as long as the tilting moment of the crane is not reached, said circuit including a plurality of switching contacts belonging to pressure monitors connected with the hydraulic cylinder which switching contacts sequentially switch off with increasing predetermined pressure values of the cylinder pressure, and a plurality of switches monitoring the angular elevation position and the telescope position of the jib which switches are closed upon reaching a predetermined position, said switching contacts being connected to said control element through said switches, the improvement wherein said switches includes a telescoping switch which is closed when the telescoping jib is retracted and is open otherwise and an additional set of switching contacts belonging to a pressure monitor connected with the hydraulic cylinder which switching contacts do not open until a higher cylinder pressure is reached than that at which all of said first mentioned switching contacts open and means connecting said telescoping switch, and the additional set of switching contacts with the electric power supply, the angular position switch which closes for the highest range of angular elevation of the jib and the control element whereby a larger load can be supported by the crane at the higher angle of elevation when the telescoping jib is retracted without terminating crane operations through deenergization of the control element.

3,987,907

ADJUSTABLE BRACKET ASSEMBLY FOR A RAIL CAR COUPLER

Glen D. Larsen, Upper Marlboro, Md., assignor to Southern Railway Company, Washington, D.C.

Filed Apr. 29, 1975, Ser. No. 572,861
Int. Cl.² B61G 7/12
U.S. Cl. 213—61 6 Claims



1. In a rail car with a coupler having its shank resting on a coupler carrier member and brackets supporting said carrier member, said brackets being mounted on side plates of the rail car, the improvement comprising each of said brackets having a serrated surface of horizontally disposed teeth of a predetermined size, pairs of vertically spaced bolts for respectively mounting said brackets in place, said brackets having pairs of vertically spaced and vertically elongated openings therein through which said bolts extend, lock plates for vertically adjusting said brackets, each of said lock plates having a serrated surface of horizontally disposed teeth of a size equal to said bracket teeth size, said lock plates having pairs of vertically spaced openings therein through which said bolts respectively extend, one of said lock plate openings having its axis intersecting with an apex of one of said lock plate teeth, and the other of said lock plate openings having its axis intersecting with a trough between a pair of adjacent teeth, said lock plate teeth intermeshing with said bracket teeth, and means engaging said bolts for retaining said brackets mounted in place, said lock plates each being disposed in a first position in which said one opening axis intersects with a trough between adjacent teeth of said brackets and in which said other opening axis intersects with a tooth apex of said brackets whereby said brackets may be disposed at a first elevation and may be vertically adjustable to a second elevation spaced from said first elevation at a distance equal to the size of at least one of said teeth, and said lock plates each being disposable in a second position inverted relative to said first position in which said one opening axis intersects with said tooth apex of said brackets while said other opening axis intersects with said trough between said adjacent teeth of said brackets whereby said brackets may be disposed at an elevation intermediate said first and second elevations and spaced therefrom a distance equal to the size of at least ½ one of said teeth.

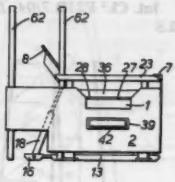
3,987,908

MINING APPARATUS

William Francis Tristram, Kirkby-in-Ashfield, England, assignor to Dowty Mining Equipment Limited, Tewkesbury, England

Filed Dec. 17, 1975, Ser. No. 641,606
Claims priority, application United Kingdom, Dec. 17, 1974, 54818/74
Int. Cl.² E21C 35/20
U.S. Cl. 214—1 MS 14 Claims

1. A ripping platform comprising a trough adapted for location under a mine roof adjacent to a mineral working face to receive debris from the roof, a first deck within the trough reciprocable in a direction lengthwise of the trough at a level above the bottom of the trough, reciprocating mechanism for the deck located within the trough under the deck, an impeller member secured to one end of the first deck and extending downwardly from the deck to the bottom of the trough, and a second deck in the trough closely engaging the first deck, the



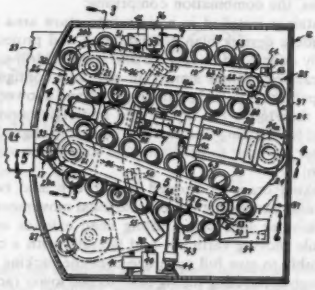
first and second decks and the impeller defining a zone between the decks and the trough bottom that is substantially isolated from the debris, said zone containing the reciprocating mechanism.

3,987,909

TOOL STORAGE MECHANISM

Tadeusz Wiktor Piotrowski, Cincinnati, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Oct. 30, 1975, Ser. No. 626,972
Int. Cl.² B23Q 3/157
U.S. Cl. 214—1 BC 4 Claims



1. In a machine tool employing a tool changer for the automatic interchange of tools between a machine spindle and a tool storage matrix, an improved tool storage mechanism, comprising in combination:

a. a tool carrier plate, pivotally supported on a pivot post which is fixed to a planar surface on said machine tool;

b. a pair of chain circuits, each respectively adapted to be carried by driven and driving shafts, wherein said shafts are rotatably mounted to said tool carrier plate so that said chain circuits will move in a plane parallel to said tool carrier plate;

c. a plurality of tool pockets carried as the links of said chain circuits, capable of receiving like tool holder shanks;

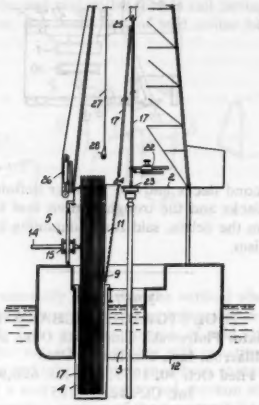
d. means carried by said tool carrier plate to drive said chain circuits and said tool pockets to predetermined positions along the pitch lines of said chain circuits; and

e. means to alternately pivot said tool carrier plate from a first position to a second position and the reverse, to alternately present a constant point on each of said chain circuits to a tool pickup position defined on said planar surface.

3,987,910
APPARATUS FOR RACKING DRILL PIPES ON FLOATER TYPE PLATFORMS

Siro Brunato, Via G. Galli, 23, Melegnano (Milan), Italy

Filed Feb. 7, 1975, Ser. No. 548,127
Int. Cl.² E21B 7/04, 15/00
U.S. Cl. 214—2.5 **6 Claims**



1. In an apparatus for temporary vertical racking below the drilling floor of drill pipes in stands on floater type drilling platforms, the combination comprising:

a container installed in a rig substructure area comprised inside a derrick plan configuration and projecting vertically downward to receive and support drill stands;

two racking frames similar in size and configuration, an upper one installed on the rig floor and a lower one parallel thereto on the top of said underlying container and said two racking frames being vertically aligned with each other in order to rack the pipe stands into vertical position;

a racking crane positioned in between said two racking frames and having three orthogonal movements wherein, a handler arm with a lifting head extends and retracts while moving vertically and laterally with a carriage assembly to give full coverage over the racking area;

a trough connecting the rig floor to said lower racking frame and acting as a guide for the pipe stand being lowered into the container or viceversa being retrieved from it;

a pipe stabber mounted above the rig floor for handling and moving the bottom of the pipe stand in alignment with centerline of a Rotary Table and a trough opening;

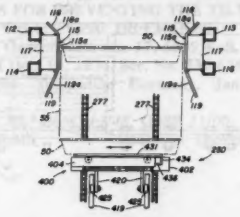
a lifting assembly for handling the heavier drill collar stands, wherein each of said racking frames have two sets of fixed type fingers properly spaced, and a set of 90° turning gates used to establish a guide for the pipes.

3,987,911
SELF-ALIGNING APPARATUS FOR STACKER-UNSTACKER ELEVATOR

Maynard R. Euverard, Clarendon Hills, and Henry A. Heide, Addison, both of Ill., assignors to Velten & Pulver, Inc., Chicago Ridge, Ill.

Filed Sept. 11, 1975, Ser. No. 612,468
Int. Cl.² B65G 59/04
U.S. Cl. 214—8.5 A **19 Claims**

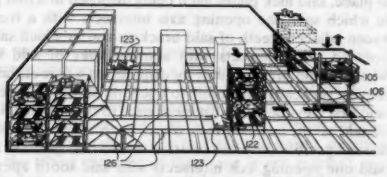
1. Self-aligning apparatus for moving stackable articles to an unstacking station comprising an elevator, article support means carried by said elevator for generally horizontal movement with respect thereto, said support means being disposed below said unstacking station for supporting a stack of articles, said elevator moving said support means upwardly and toward the unstacking station to permit unstacking of articles from said support means at the unstacking station, and guide means mounted adjacent to the unstacking station for engagement with articles at the top of a misaligned stack as they are moved to the unstacking station by said elevator for deflecting and horizontally moving the articles properly to align them with respect to the unstacking station, the horizontal movement by said guide means of the articles at the top of the misaligned stack on said support means effecting a corresponding horizontal movement of said support means, whereby the entire stack is moved into proper alignment with respect to the unstacking station so as to prevent displacement of the top of the stack with respect to the bottom thereof or other disruption of the stack as a result of the deflecting action of said guide means.



3,987,912
MOVABLE VEHICLE PARKING TOWERS

Rafael Leon Moyano, Obispo Mardone, 78, Cordoba, Spain

Continuation-in-part of Ser. No. 332,756, Feb. 15, 1973, abandoned. This application Dec. 5, 1974, Ser. No. 530,026
Claims priority, application Spain, June 3, 1972, 403,493; Jan. 9, 1973, 410,480
Int. Cl.² E04H 6/06
U.S. Cl. 214—16.1 C **7 Claims**



1. An automated vehicle parking system comprising:

a large vehicle parking area having a floor and ceiling and free of intermediate floors;

said floor having thereon a plurality of intersecting tracks extending perpendicularly to each other;

a plurality of towers movable along said tracks, each of said towers having therein a plurality of vehicle supporting floors;

said vehicle parking area having vehicle extrance and exit means;

means operatively associated with said entrance and exit means and said towers for transferring vehicles to and from said floors of said towers; and

means for selectively engaging and moving said towers between said entrance and exit means to and from predetermined positions in said vehicle parking area, said tower moving means comprising at least one power car movable on said tracks beneath said towers, said power car having mounted thereon means for selectively altering the direction of movement of said power car along said perpendicularly intersecting tracks, and said power car having thereon upwardly extendible jack means for selectively

engaging and lifting a tower positioned above said power car.

3,987,913

SIDE LOADER MAST TRAVERSING MECHANISM

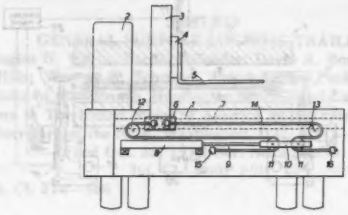
Peter Lickfold, Leighton Buzzard, England, assignor to Lancer Boss Limited, Leighton Buzzard, England

Filed June 15, 1973, Ser. No. 370,294

Claims priority, application United Kingdom, June 21, 1972, 29097/72

Int. Cl.² B66F 9/10

U.S. Cl. 214—75 G 4 Claims



1. For a side loader vehicle having chassis including front and rear wheeled body parts interconnected by a backbone structure with a recess extending transversely of the chassis between said body parts and having mast guide means along the sides of said recess, a mast traverse mechanism comprising mast supporting means moveable along said guide means, a shaft rotatably mounted with respect to said chassis and extending across said recess out of said path of travel of said mast supporting means, a roller fast on said shaft for rotation therewith at each side of said recess, at each side of said recess at the opposite end of said path to said shaft a roller freely rotatably journalled with respect to said chassis, a prime mover mounted on said chassis and operatively connected to a pair of idler rollers to translate them transversely of said vehicle alongside said recess, a flexible mem.ber on one side of said recess anchored at its ends to said chas is and passing in succession over one of said idler rollers, both of said freely rotatable rollers, and the other of said idler rollers, said flexible member having a reach secured to said mast supporting means and at the other side of said recess a second flexible member on the other side of said recess passing round said roller on said shaft and said freely rotatable roller on said other side of said recess and having a reach secured to said mast supporting means, whereby movement of said idler rollers by said prime mover causes said flexible members to translate said mast supporting means at both sides of said recess along said guide.

3,987,914

TWO-PIECE BACKHOE BOOM

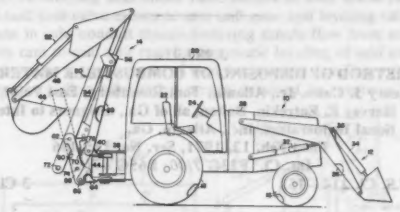
Roger Dale VanDerZyl, East Dubuque, Ill.; Larry Gene McMullen, and Leroy Ernest Kraske, both of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Nov. 4, 1975, Ser. No. 628,794

Int. Cl.² E02F 3/80

U.S. Cl. 214—138 R 8 Claims

1. A backhoe structue comprisng: a swing frame; a boom including, with reference to the swing frame, an inner section vertically pivotally connected to the swing frame; an outer section vertically pivotaly connected to the inner section; an extensible and retractable hydraulic actuator connected between the outer section and the swing frame; a releasable lock means normally preventing the outer section from pivoting relative to the inner section to thereby rigidify the boom whereby the hydraulic actuator is operative to move the inner and outer sections between respective fully raised and lowered operating positions; stop means for preventing the inner section from moving upwardy beyond its fully raised position; and



said lock means being releasable to permit the outer section to be pivoted by the actuator upwardly beyond its fully raised position to a transport position.

3,987,915

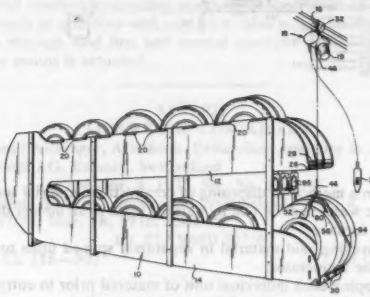
TIRE STORAGE AND RETRIEVAL SYSTEM AND METHOD

John R. Conner, 3003 Bluffwood Terrace, St. Joseph, Mich. 49085

Filed Mar. 21, 1975, Ser. No. 560,971

Int. Cl.² B65G 47/00

U.S. Cl. 214—152 2 Claims



1. Method for handling tires utilizing apparatus comprising storage means including sloping track means having an inlet at its upper end and a passageway at its lower end and a front end adjacent a working station and a rear end removed from the working station and having upper and lower levels communicating with each other at said rear end with the upper level sloping downwardly and away from said front end and the lower level sloping downwardly and toward said front end so that the inlet of the track means and the passageway at its lower end are both adjacent the working station and including stop means at the lower end to hold the tires in rolling relation to the track means, overhead power hoist means with a flexible lift means, gripper means including an elongated handle to be manipulated by an operator at the working station, means attaching said gripper means to said flexible lift means, said method comprising the steps of

a. placing tires on the track means to provide a series of tires on the track means in rolling relation to the track means and extending from the passageway at the lower end,

b. circulating tires including the steps of gripping the tire positioned at the lower end of the track means with the gripper means, removing that tire from the passageway at the lower end and lifting it to the inlet at the upper end by means of the hoist means, guiding the tire utilizing the handle means, and depositing the tire on the track means, whereby tires on the track means roll toward the passage-

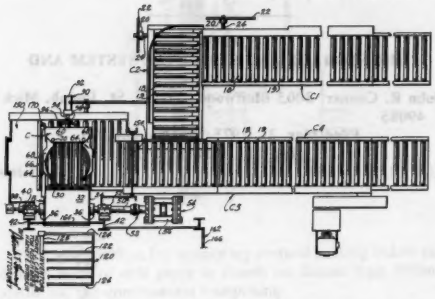
way at the lower end,
c. retrieving a desired tire.

3,987,916

METHOD OF DISPOSING OF COMBUSTIBLE MATERIAL

Henry J. Cates, Jr., Atlanta; Tom Rosenberg, East Point, and Harvey E. Entrekin, Dalton, all of Ga., assignors to International Incinerators, Inc., Atlanta, Ga.

Filed Feb. 12, 1971, Ser. No. 115,486
Int. Cl.[2] F23G 7/00; B65G 47/82
U.S. Cl. 214—152 3 Claims



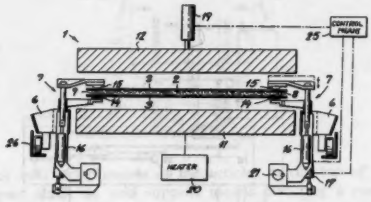
1. In a method of disposing of combustible material such as plastic waste and the like by burning same in an incinerator or other furnace:
conveying said material in separately spaced units toward the incinerator,
stopping each individual unit of material prior to entry into the incinerator at a place to be grasped, by a means for grasping, providing an air lock housing comprising a closed space having a first closure means for an opening therein leading to said means for grasping,
providing a second closure separating said furnace from said first closure and from said place at which said unit is grasped so that said first closure may be opened for loading and then closed and a second closure may be opened for disposal,
conveying the material continuously toward the incinerator, timing the delivery of successive units by means of an electric sequence timer switch,
stopping the material prior to entry into the incinerator and while said second closure is closed contacting a switch means by said unit thereby opening said first closure and then closing same by electrical actuation by said unit to separate said unit being disposed from the next succeeding units, electrically relating said first and second closures to prevent said first closure from being open during the disposal of a unit,
providing electrical control means and actuating same for closing the first closure providing electrical control means for opening the second closure and transferring and releasing said material to the incinerator, closing the second closure and thereafter opening the first closure to admit the next successive unit of material for disposal, whereby successive units are disposed of without the danger of explosion through an open first closure.

3,987,917

METHOD OF LOADING A WORKPIECE STACK INTO A PLATEN PRESS

Walter Hüsges, Niederkruchten, and Manfred Posselt, Viersen, both of Germany, assignors to G. Siempelkamp & Co., Krefeld, Germany

Division of Ser. No. 533,219, Dec. 16, 1974, Pat. No. 3,977,531. This application Aug. 14, 1975, Ser. No. 604,814
Claims priority, application Germany, Dec. 21, 1973, 2363795
Int. Cl.[2] B66C 1/22
U.S. Cl. 214—152 1 Claim



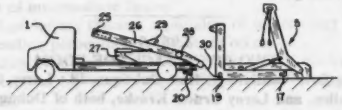
1. A method of loading a stack of sheets between the platens of a press, said method comprising the steps of:
gripping said stack along opposite edges flanking a transport direction;
thereafter displacing said stack in said direction between said platens;
thereafter releasing one of said edges and dropping same onto the lower platen;
thereafter releasing the other edge to drop the rest of said stack onto said lower platen; and
heating said lower platen and adhering said one edge thereto after releasing of same so as to prevent relative shifting of said sheets.

3,987,918

DEVICE FOR LOADING OR UNLOADING BOXES OR REMOVABLE BUCKETS, IN PARTICULAR FOR LORRIES

Antoine Corompt, La Metare, rue Rembrandt, Saint-Etienne (Loire), France

Filed Dec. 9, 1974, Ser. No. 531,229
Claims priority, application France, Dec. 11, 1973, 73.45381
Int. Cl.[2] B60P 1/64
U.S. Cl. 214—505 10 Claims



1. A handling device, in particular for a lorry intended for handling containers by hoist means, comprising:
a chassis including a horizontal portion and a vertical portion extending upwardly from the forward end of said horizontal portion;
said chassis being provided with two arms pivoted on the rear part of said horizontal portion furthest from said vertical portion;
said arms being provided with means which are adapted to be attached to removable buckets to allow loading and unloading said removable buckets from the horizontal portion of said chassis;

said arms having connected thereto power means affixed to said chassis, said power means being adapted to impart pivotal movement to said arms to facilitate loading and unloading said removable buckets from the horizontal portion of said chassis;

said chassis is provided with means for selectively engaging said hoist means of said lorry so that said chassis can be hoisted into position on said lorry or laid on the ground to permit said lorry to handle said containers; and

said chassis and said lorry are both provided with suitable engaging means for holding said chassis in position when on said lorry to permit said lorry to handle said removable buckets.

3,987,919

GENERAL PURPOSE LOGISTIC TRAILER

Douglas H. Weeks, Pacific Palisades; David A. Bond, Rolling Hills; Warren C. Schreyer, Palos Verdes Peninsula, and John M. Bloodworth, Huntington Beach, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 28, 1975, Ser. No. 626,530

Int. Cl.² B60P *1/04*

U.S. Cl. 214—506 **12 Claims**

1. A self-loading trailer comprising in combination:

a trailer frame extending longitudinally of said trailer;

an elongate bed, having first and second ends, supported on said trailer frame and presenting a load carrying surface;

first and second carriage means, coupled to said trailer frame under first and second ends thereof corresponding to said first and second ends of said bed, for supporting said trailer frame and bed for rolling movement over a ground surface;

ramp means, pivotally connected to said second end of said bed, for movement between a plurality of positions including a trailer frame and bed end elevating position and an extended position presenting a ramp surface in substantially the same plane as said load carrying surface;

ramp jack means, connected between said trailer frame and said ramp means, for effecting movement of said ramp means between said positions; and said second carriage means being movable along said frame, from under said second end thereof, to a location adjacent said first carriage means while said frame and bed are held elevated at said second ends thereof by said ramp means, whereby said frame and bed are adapted to be tilted by gravity to pivot from a substantially horizontal position to an inclined position when said ramp jack means is operated to move said ramp means to said extended position.

3,987,920

SELF-LEVELING SYSTEM FOR MATERIAL HANDLING IMPLEMENT

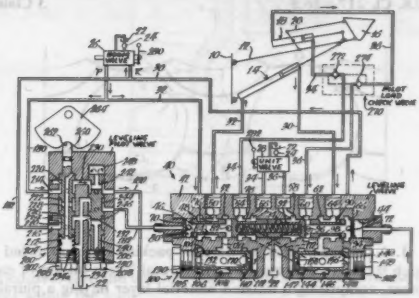
Donald J. Parquet, Burlington; Marvin L. Brown, West Burlington, and Carl O. Pedersen, Burlington, all of Iowa, assignors to J. I. Case Company, Racine, Wis.

Filed June 23, 1975, Ser. No. 589,439

Int. Cl.² E02F *3/87*

U.S. Cl. 214—763 **10 Claims**

1. In a vehicle having a boom pivoted thereon; a boom ram for raising and lowering said boom on said vehicle; a material handling unit pivoted on said boom; a unit ram for pivoting said unit on said boom; and a hydraulic circuit for supplying fluid to said rams, said hydraulic circuit including a reservoir; pump means supplying fluid under pressure from said reservoir; boom valve means between said boom ram, reservoir and pump means; unit valve means between said unit ram, reservoir and pump means; boom and unit conduit means respectively connecting said boom valve means to said boom ram and said unit valve means to said unit ram; and leveling valve means in said conduit means metering return flow from said boom ram to said unit ram for automatic leveling of said unit in response to movement of said boom, said leveling valve means including pilot valve means actuated in response to



actuation of said unit valve means to prevent flow from said boom ram to said unit ram said leveling valve means further including a valve housing having a valve bore therein, and spool means in said valve bore, further including first and second conduits connecting said boom valve means to opposite ends of said bore with said pilot valve means interrupting flow through said first and second conduits when said unit valve means is actuated.

3,987,921

CLOSURE FOR CONTAINERS

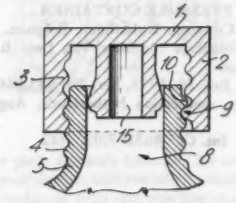
Dietmar Aichinger, Arlesheim, Switzerland, assignor to Albert Obrist AG, Reinach, Switzerland

Filed Apr. 8, 1975, Ser. No. 566,097

Claims priority, application Switzerland, Nov. 4, 1974, 15007/74; Mar. 18, 1975, 3541/75

Int. Cl.² B65D *51/16*

U.S. Cl. 215—307 **10 Claims**



1. In combination, a pressurized container having an externally threaded container neck opening, and a screw cap positioned thereon, said screw cap having internal threading and a stopper projecting into and sealing the opening, characterized in that at least one radial enlargement is provided on the internal surface of said cap in the region of the beginning of the thread commencement adjacent the open end of the cap so as to ensure firm engagement of the cap threading with the opposing container threading until after said stopper unseals said opening and releases the container pressure during removal of the cap, said radial enlargement projecting radially inwardly beyond the radially inner surface of said cap thread by a radial distance less than the circumferential extent of said enlargement, and being located and arranged to prevent blow-off of said cap during the latter stage of removal and attendant decreased thread engagement.

3,987,922

PACKAGING TRAY FOR FRUIT

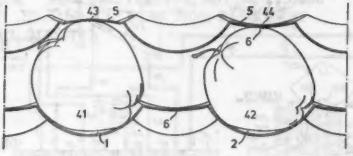
Lauri Olavi Kaira, Kuusankoski, Finland, assignor to Kymin Osakeyhtio-Kymmene Aktiebolag, Kuusankoski, Finland

Filed Nov. 6, 1974, Ser. No. 521,446

Claims priority, application Finland, Nov. 16, 1973, 3555/73

Int. Cl.² B65D *85/34*

U.S. Cl. 217—26.5 3 Claims



1. A packaging tray for fruit for packing fruit supported on such trays in a transport box in several layers on top of each other, comprising a molded material layer having a plurality of substantially calotte-shaped depressions for fruit arranged in parallel rows, and supporting areas between said depressions, said depressions and supporting areas being arranged such that a depression of an upper tray coincides with a supporting area of the next lower tray, said supporting areas being situated at a higher level than the lowermost points of said depressions of the same packaging tray but still at a sufficiently low level to touch the uppermost points of the fruit supported on the next lower tray, said supporting areas having central portions forming downwardly convex surfaces in all vertical cross-sections, said central portions having a radius of curvature larger than the average radius of curvature of said fruit to be packed and a thickness selected in relation to the rigidity of the material of said tray and to said radius of curvature to render said central portions yieldable from said downwardly convex shape in unloaded condition to a downwardly concave shape conforming substantially to the upper surface of said fruit, under the forces appearing in placing a tray loaded with fruit in a transport box.

3,987,923

PRESSURE CONTAINER

Matheus J. M. Coppens, Kalmthout, Belgium, assignor to Koninklijke Emballage Industrie Van Leer B.V., Amstelveen, Netherlands

Filed July 30, 1974, Ser. No. 493,060

Claims priority, application Netherlands, Aug. 14, 1973, 7311202

Int. Cl.² B65D *7/02*, *7/42*

U.S. Cl. 220—3 5 Claims

1. A pressure container comprising:

a cylindrical metal sleeve,

an outwardly domed end wall, at least at one end of said sleeve,

a seam connection between the outer end of said cylindrical metal sleeve and a flange of said outwardly domed end wall,

said domed end wall extending axially away from the seam connection and having an outwardly turned surface, adjacent the seam connection, which extends substantially parallel to the cylindrical sleeve, said outwardly turned surface having an outer diameter smaller than the inner diameter of the sleeve and being positioned therewithin,

a reinforcement ring locked between said outwardly turned surface of the domed end wall and the seam connection thereadjacent, and

said reinforcement ring being enclosed within a circumferentially extending channel formed between said outwardly turned surface of the end wall and the seam connection so as to lock the reinforcement ring axially and radially.

3,987,924

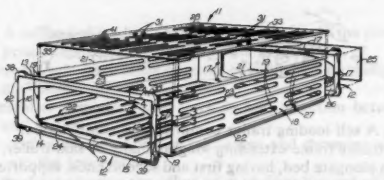
PLASTIC CONTAINER

Mark O. Uitz, 1050 Crestview Drive, Mountain View, Calif. 94040

Filed July 25, 1975, Ser. No. 599,137

Int. Cl.² B65D *7/00*, *7/30*

U.S. Cl. 220—4 F 18 Claims



1. In a plastic container:

a pair of plastic end wall structures having a plurality of plastic prong portions projecting therefrom;

an intermediate plastic wall structure having a pair of spaced apart side edge portions and a pair of spaced apart end edge portions, said intermediate wall structure having a plurality of generally parallel tubular reinforcing rib portions disposed in generally parallel relation with said side edge portions, said tubular rib portions being disposed in registration with said prongs of said end wall structures to receive said prongs axially of said tubular rib portions for affixing said end wall structures to said intermediate wall structure.

3,987,925

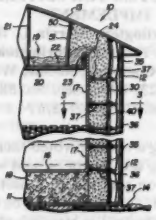
INSULATED TANK

Stanley E. Sattelberg, Naperville, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Aug. 11, 1975, Ser. No. 603,527

Int. Cl.² B65D *87/24*, *25/18*

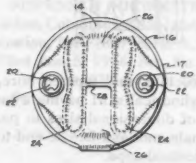
U.S. Cl. 220—9 LG 5 Claims



1. A storage tank comprising:

an inner shell;
an outer shell surrounding and spaced from the inner shell;
a flexible main membrane between the inner shell and the outer shell;
granular insulation between the inner shell and the membrane; and
tension line means girding the membrane and pressing it into contact with the granular insulation.

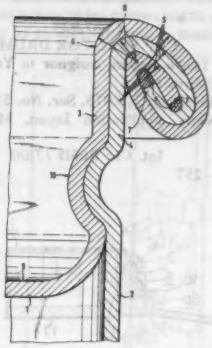
3,987,926
BLOW MOLDED CONTAINER
William M. Yavorsky, Spartanburg, S.C., assignor to Harley Corporation, Spartanburg, S.C.
Filed July 7, 1975, Ser. No. 593,648
Int. Cl.² B65D 7/42
U.S. Cl. 220—66 **9 Claims**



1. A blow molded container comprising a bottom wall, a top wall and a side wall, said top wall having at least one dispensing opening therein, said at least one opening being defined by said top wall and a projection extending upwardly from said top wall, said projection being otherwise unattached and having a closure member removeably received therein, said top wall further having a pair of spaced apart raised ribs thereon and of unitary construction therewith, said ribs defining a valley therebetween, and a solid member located between said ribs and being of unitary construction with said ribs and said valley defined therebetween, said solid member being uninterrupted therealong and terminating at said ribs.

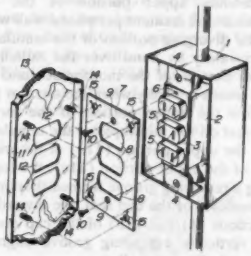
3,987,927
BEAD JOINT
Georg Serr, Neustadt, Weinstrasse, and Franz Gobauer, Hambach, both of Germany, assignors to Rheinpfalzische Blechemballagenfabrik G. Schonung & Co. KG, Neustadt, Germany
Continuation of Ser. No. 265,755, June 23, 1972, abandoned.
This application June 24, 1974, Ser. No. 482,412
Claims priority, application Germany, July 8, 1971, 2134034
Int. Cl.² B65D 7/44
U.S. Cl. 220—67 **1 Claim**

1. In a bead joint disposed outwardly along the rolled top edge portion of a container side wall and end wall, the side and end wall edges being conformingly adjacent each other and folded over several times to form a plurality of folds forming the joint, and a sealing means within the joint, the improvements of the folds having unequal bending radii to impart to the bead joint a generally elliptical or egg-shaped cross section, the major axis of the bead joint cross section being inclined towards the axis of the container, the bending radius of transition of the container and a first one of the bead joint folds being relatively small whereby the first bead joint fold encloses an angle of less than 90° with the side wall to provide a zone of added stiffness, the bending radius then gradually increasing to form an arcuate portion of the bead joint cross section and the bending radius then further varying to complete the bead joint with at least two further folds, and the



folded-over side and end wall edges being in contact with each other within the joint.

3,987,928
MOUNTING DEVICE FOR A COVER PLATE FOR A WALL OUTLET BOX
Shinjiro Mori, Tokyo, Japan, assignor to Mori Denki Manufacturing Co., Ltd., Tokyo, Japan
Division of Ser. No. 450,449, March 12, 1974, abandoned.
This application June 2, 1975, Ser. No. 582,826
Claims priority, application Japan, Jan. 11, 1973, 48-122172
Int. Cl.² H02G 3/14
U.S. Cl. 220—241 **2 Claims**



1. A cover plate assembly for a box for accommodating an electrical circuit device, said assembly comprising an intermediate plate having at least one opening at a position corresponding to the position of the electrical circuit device in the box, and an ornamental cover plate having at least one opening at a position corresponding to the opening in said intermediate plate, said corresponding openings permitting projection therethrough of a portion of the electrical circuit device projecting from the box, said ornamental cover plate having an ornamental pattern on its front surface, said ornamental cover plate having on its back surface a plurality of threaded rods, said intermediate plate having a first plurality of holes at positions corresponding to the positions of said threaded rods on the ornamental cover plate, the holes of said first plurality of holes being elliptical in shape and each being oriented in a different direction from the holes adjacent thereto, and a further plurality of holes for accommodating fastening elements for mounting the intermediate plate on said box, whereby the intermediate plate can first be mounted on the box by fastening elements and the ornamental plate, then

mounted on the intermediate plate by the insertion of the threaded rods into the holes of the first plurality of holes.

3,987,929

CAP SEAL FOR DRUM

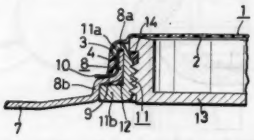
Kinji Mineo, Tokyo, Japan, assignor to Yamato Iron Works Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1975, Ser. No. 554,431

Claims priority, application Japan, Mar. 4, 1974, 49-25911[U]

Int. Cl.[2] B65D *17/00*

U.S. Cl. 220—257 **1 Claim**



1. In combination a unitary cap seal (1) and a drum equipped with a generally cylindrical mouthpiece (11) having a radially outwardly extending upper portion (11*a*), the cap seal being formed integrally from elastic, resilient material selected from the group consisting of polypropylene, polyethylene, nylon, polystyrene, and polyvinyl chloride, and having a circular top wall (2) and a peripheral wall (3) depending from the top wall, an annular projection (15) which extends downwardly from the top wall and an annular projection (4) extending inwardly from the middle portion of the peripheral wall and then diverging progressively outwardly toward the bottom of the peripheral wall, the inner diameter of the annular projection being less than the outer diameter of the radially outwardly extending upper portion of the mouthpiece whereby the elastic and resilient peripheral wall will be forced outwardly as the diverging portion of the annular projection is pushed downwardly by hand over the radially outwardly extending upper portion of the mouthpiece and the annular projection will return inwardly when the annular projection is positioned below the upper portion of the mouthpiece to retain the cap seal on the mouthpiece, the annular projection (15) engaging the upper portion (11*a*) of the mouthpiece at the upper end of the upper portion (11*a*), the top wall of the cap seal having a removing groove formed therein to facilitate cracking and removal of the cap seal, the inwardly extending annular projections (4) and (15) of the cap seal being provided with a vertically extending groove aligned with the removing groove in the top wall.

3,987,930

DUAL-ENDED TUBING CAP

Robert Lee Fuson, North Branch, N.J., assignor to Ethicon, Inc., Somerville, N.J.

Filed Sept. 26, 1974, Ser. No. 509,362

Int. Cl.[2] A61M *1/00*, *25/00*; B65D *41/28*

U.S. Cl. 220—352 **4 Claims**

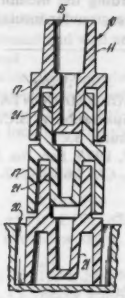
1. A cap for sealing Luer-tapered intravenous tubing couplings, comprising:

means for capping off a male Luer-tapered tubing end having a Luer-tapered surface; and

means for capping off a female Luer-tapered tubing end having a Luer-tapered surface and being connected to and protruding from said male end capping off means;

said male end capping off means including a back plate with a cylindrical structure extending therefrom, said cylindrical structure having a constant outside diameter, a tapered bore which is reduced going into said cylinder and an end parted off perpendicular to the longitudinal axis of said bore;

said female end capping off means including a tapered plug extending from said back plate and tapering down to a free end being perpendicular to the extension of said plug, and a cylindrical skirt extending from said back plate about said tapered plug;



said cylindrical structure, said tapered bore, said tapered plug and said cylindrical skirt having a same centerline axis and being of dimensional sizes to permit stacking, male-end-to-female-end, and female-end-to-male-end, of said cap with identical caps.

3,987,931

PREPARATION OF FLAT ITEMS FOR AUTOMATIC DISPENSING

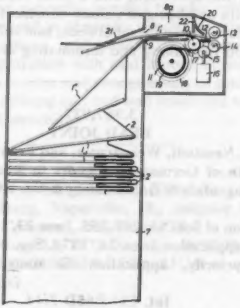
Wolfgang Feil, and Lothar Märtin, both of Constance, Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Apr. 16, 1975, Ser. No. 568,525

Claims priority, application Germany, Apr. 24, 1974, 2419737

Int. Cl.[2] B65H *5/28*

U.S. Cl. 221—73 **12 Claims**



3. Apparatus for dispensing flat, flexible items individually in succession, a plurality of such items being releasably fastened to one side of a support tape in a manner such that the items are spaced along the length of the tape and each item is fastened at a region of the tape located in a respective successive section of the tape, and the tape being folded along fold lines transverse to its length to form a pleated tape having the fastened items stacked one atop the other; said apparatus comprising:

means defining a storage receptacle having a side wall provided with a lateral discharge opening located in the region of its upper end, the pleated tape being disposed in said receptacle with the end thereof adjacent the uppermost item of the stack passing through the opening;

means defining a separation surface disposed outside said receptacle and arranged to move the tape in a first direction, said surface being located in a manner such that it faces the side of the tape opposite the one side at which the items are releasably fastened; j

guide means disposed for guiding each item in a second direction when the section of tape associated with that item is being moved in the first direction along said separation surface, the angle between said first and second directions being such as to cause each such item to be released from the tape;

an abutment member disposed for preventing items which are not properly fastened to the tape from passing completely through said discharge opening; and

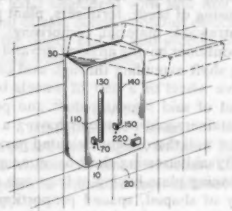
means defining a guide surface for bending each item as it passes through said discharge opening and before its leading edge reaches said guide means.

3,987,932

DISPENSER FOR RESTROOMS

Ronald L. Maldon, Columbus, Ohio, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Jan. 5, 1976, Ser. No. 624,489
Int. Cl.² A47F *1/00*
U.S. Cl. 221—96 **4 Claims**



1. A dispenser for restrooms, comprising:

a housing attached to a wall of the restroom;

a first means for holding a vertical stack of disposable cups in the housing and releasing the lowest cup in the stack when operated;

a first push button attached to the front of the housing for operating the first means;

a reservoir in the housing for storing liquid mouthwash;

a second means attached to the reservoir for introducing the mouthwash into a cup that has been released;

a second push button attached to the front of the housing for operating the second means;

a frame in the housing for supporting a conventional tube of toothpaste in a vertical, downwardly pointed position; and

a third push button attached to the front of the housing for squeezing the tube when pressed and thus causing toothpaste to be squeezed downwardly out of the tube.

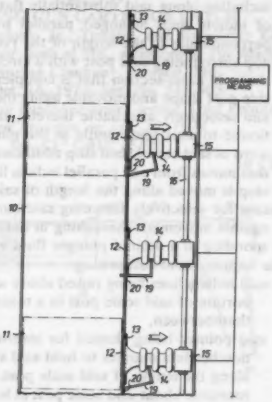
3,987,933

MAGAZINE FOR WARES FOR USE IN AUTOMATIC SHOPS

Nils Gosta Sigvard Ishammar, Manstigen 5, S-216 18 Malmo, Sweden

Filed Feb. 19, 1975, Ser. No. 551,192
Int. Cl.² G07F *11/16*
U.S. Cl. 221—298 **5 Claims**

1. A magazine for wares for use in automatic shops, comprising a shaft for receiving a pile of packages, wherein there are distributed along the shaft a plurality of suction means for retaining the packages individually in the shaft without the packages being in contact with each other, said suction means being individually controllable in order to be made inoperative temporarily during a short interval one at a time in sequence beginning from below and continuing upwards, said suction means being connected to a suction line, via a solenoid valve, said solenoid valves being connected to a programming means in order to be closed, resulting in making the suction



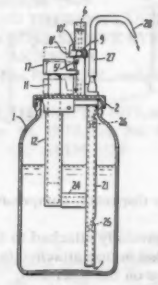
means inoperative in the indicated sequence, and each said suction means being provided with a sensing member entering the shaft in order to make the suction means operative as a result of a package hitting the sensing member when the package is located opposite the pertinent suction member.

3,987,934

VOLUME SETTING MECHANISM FOR FLUID DISCHARGE DEVICES

Richard Dean Reed, San Jose, and Doud Roger Branham, Redwood City, both of Calif., assignors to Oxford Laboratories Inc., Foster City, Calif.

Filed Aug. 16, 1974, Ser. No. 497,853
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² G01F *11/06*
U.S. Cl. 222—43 **2 Claims**



1. In a fluid dispensing device that comprises:

a barrel forming a fluid chamber,

a plunger positioned with one end extending into said barrel and another end remaining outside of said barrel,

an operating handle attached to the plunger at its outside end,

means permitting fluid to be drawn into said chamber when the plunger is moved in a direction out of the chamber and permitting fluid to be discharged when the plunger is moved in an opposite direction into said chamber,

an elongated scale post held fixed with respect to said barrel, and characterized by a uniform shape along at least a portion thereof in a cross-section perpendicular to its length, said shape including a circular portion joined by substantially a straight line, thereby to form a substantially flat portion along its length, said scale post further including along said substantially flat portion a plurality of indicia lines arranged parallel to one another and perpendicular to the length of the post in a row,

a stop surrounding said post with a circular interior surface shape in cross-section that is complementary to the outside post shape and movable along the length of said post and selectively attachable thereto, said stop being positioned to abut said handle as the plunger is moved outward of said barrel, said stop additionally having a pointer that moves from one parallel indicia line to another as the stop is moved along the length of said scale post, and

means for selectively fastening said stop to said scale post against movement therealong at desired positions corresponding to a desired plunger fluid volume;

the improvement comprising:

said indicia lines being raised above said substantially flat portion of said scale post in a manner to form notches therebetween,

said pointer being shaped for insertion into any of said notches in a manner to hold said stop from movement along the length of said scale post, and said stop being rotatable about said scale post at least from an extreme position wherein said pointer is fully nested within the desired position of one of said notches to at least a second extreme position wherein said pointer clears said raised indicia lines to permit movement of said stop along the length of said scale post,

whereby the volume of fluid dispensed by said device is accurately set by positive detent engagement.

3,987,935

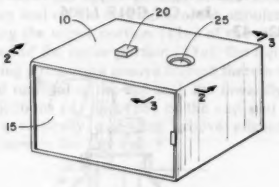
PERFUME DISPENSER

Raphael P. Caluscos, Newark, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,489

Int. Cl.² B05B *15/00*

U.S. Cl. 222—173 **1 Claim**



1. A perfume dispenser, comprising:

a housing,

a lever arm pivotally attached to the housing,

a spring loaded button attached to and passing through the housing to press on the lever arm,

a distal end of the lever arm forming a loop,

an internal support stand mounted in the housing,

a pressurized perfume container mounted on the stand,

a nozzle attached to the top of the container for dispensing the perfume,

the housing forming a slightly depressed opening over the nozzle,

the loop of the lever arm removably insertable over the nozzle, whereby pressing on the button causes the pivotal movement of the lever arm thereby pressing on the nozzle causing the release of the perfume through the opening, and

means of inserting and removing the perfume container and a refill container into and from the housing.

3,987,936

STREWING APPARATUS FOR GARDEN USE

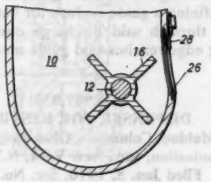
Walter Kolb, and Dieter Achenbach, both of Betzdorf, Sieg, Germany, assignors to Wolf-Gerate GmbH, Germany

Filed Oct. 2, 1974, Ser. No. 511,116

Claims priority, application Germany, Oct. 15, 1973, 2351689

Int. Cl.² A01C *15/00*

U.S. Cl. 222—177 **5 Claims**



1. A strewing carriage for garden operation for proportioned dispensing of seeds, fertilizers, plant protective agents and similar strewable material, comprising:

a fillable container having an open top and a closed bottom;

a strewing shaft extending through said container;

a respective wheel of a pair of wheels being mounted at each end of said strewing shaft and positioned outside said container; said container having a recess extending through a wall thereof and oriented parallel to said strewing shaft; said strewing shaft being near said recess;

a proportioning plate having at least one row comprising a plurality of shaped, spaced proportioning openings extending through said plate and along the length of said proportioning plate; said plate being of dimensions to fill said recess;

means for removably mounting said proportioning plate to fill said recess and at an orientation such that said at least one row of proportioning openings is generally parallel to said strewing shaft;

the shape, size, position and number of said proportioning openings being predeterminately established to enable uniform spreading of a selected strewable material;

said removable mounting means comprising a plurality of rails, each rail having a first portion molded into the wall of said container along at least a portion of the periphery of said recess and a remaining portion extending into said recess for mounting said proportioning plate.

3,987,937

POWDER FEEDER AND METHODS FOR TRANSPORTING PARTICULATE MATERIAL

Robert G. Coucher, Salt Lake City, Utah, assignor to EPPCO, Salt Lake City, Utah

Continuation-in-part of Ser. No. 140,838, May 6, 1971, abandoned. This application Feb. 7, 1972, Ser. No. 223,969

Int. Cl.² B67D *5/54*

U.S. Cl. 222—193 **10 Claims**

1. Apparatus comprising:

a closed vessel with an interior;

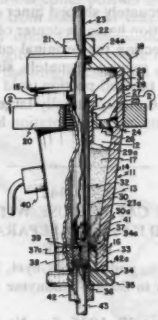
means for introducing particulate material to the interior of said vessel;

an orifice, opening into the vessel from its bottom, oriented to admit gas forced therethrough in an upwardly directed jet stream into the interior of said vessel;

an outlet at the top of said vessel;

a first conduit, mounted within the vessel in approximately axial alignment with said orifice, with the lower end of

said first conduit directly above said orifice and sufficiently near the bottom of the vessel to prevent powder contained within the vessel from filling the space between said lower end and said orifice, and with the upper end of said first conduit in open communication with the interior of said vessel; and



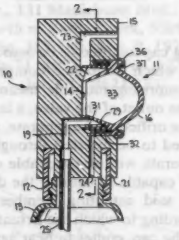
a second conduit of smaller cross section than said first conduit mounted within and concentric with and in approximately axial alignment with said first conduit with the lower end of said second conduit directly above said orifice and the upper end of said second conduit openly communicating with said outlet.

3,987,938

DISPENSING PUMP

Rex C. Cooprider, Hacienda Heights; Richard P. Grogan, San Bernadino, and Michael G. Knickerbocker, Long Beach, all of Calif., assignors to Diamond International Corporation, New York, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,659
Int. Cl.² B65D *37/00*
U.S. Cl. 222—209 **13 Claims**



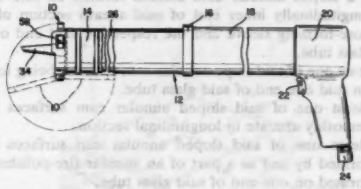
6. A dispensing pump, comprising an elongated housing forming a handle grip, said housing having inlet and vent passages therein, a recess located in a side wall of said housing, a resiliently deformable diaphragm seated over said recess and defining a variable volume pump chamber therewith, said inlet passage extending between an end wall of said housing and opening into said recess, a discharge port extending outwardly of said recess, said diaphragm having an inlet valve in the form of a first annular skirt for closing said inlet passage as said diaphragm is deformed, a discharge valve in the form of a second annular skirt on said diaphragm, said second annular skirt normally closing said discharge port and being deflectible to uncover said discharge port in response to increased fluid pressure within said pump chamber, a vent port in said housing communicating with an outwardly extending opening in said diaphragm, said vent passage extending between said end wall of said housing and communicating with said vent port, and a vent valve on said diaphragm in the form of third annular skirt which normally closes said vent port but is deflectible to open said vent port in response to decreased fluid pressure within said vent passage.

3,987,939

CAULKING GUN CARTRIDGE LATCH

Michael Joseph Pedone, Jr., Towson, and Hanspeter Ehrenfried Beisch, Belair, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Filed Oct. 16, 1974, Ser. No. 515,303
Disclosure was also published under second Trial Voluntary Protest Program on Jan. 20, 1976
Int. Cl.² G01F *15/00*
U.S. Cl. 222—325 **10 Claims**



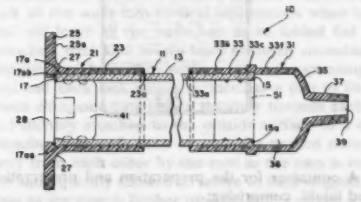
1. A portable, power-operated cartridge dispensing device comprising a housing having a dependent handle and a power cylinder tube extending forwardly thereof, an elongated cartridge retaining tube extending forwardly of said power cylinder tube and having an open front end for free insertion and removal of a cartridge, an integral latch member pivoted by fixed pivot means on the front end of said cartridge retaining tube and outside its confines, said latch member being pivotable from a first position obstructing said open front end of said cartridge retaining tube wherein a cartridge in said retaining tube is prevented from moving out the front end thereof, to a second position clear of said cartridge retaining tube front end wherein the cartridge may be withdrawn from or inserted in said cartridge retaining tube through its open front end, said latch member and said cartridge retaining tube having cooperable interlocking portions releasably holding said latch member in its first position.

3,987,940

GLASS TUBE AND THERMOPLASTIC RESIN FINGER-GRIP AND NOSE SLEEVE SYRINGE BODY ASSEMBLY

Edward A. Tischlinger, Des Plaines, Ill., assignor to MPL, Inc., Chicago, Ill.

Division of Ser. No. 197,718, Nov. 11, 1971, abandoned. This application Mar. 18, 1974, Ser. No. 451,925
Int. Cl.² A61M *5/28*
U.S. Cl. 222—386 **2 Claims**



1. A glass tube and non-glass finger-grip and nose-forming arrangement for use particularly in packaging and subsequent dispensing of chemicals, comprising:

a substantially cylindrical glass tube formed of a length of substantially constant diameter thin-walled glass tubing of

substantially constant wall thickness along its length and having a wall thickness substantially smaller than the outer and inner wall diameters of said glass tubing,

a finger-grip sleeve of thermoplastic resin and having a tube-gripping sheath section with laterally extending finger-grip protrusions integrally formed thereon,

and a nose-forming sleeve of thermoplastic resin and having a reduced diameter section integral with a tube-gripping sheath section thereof,

said sleeves being frictionally secured in annularly extending stretch-fit along their sheath sections over and along respectively opposite ends of said glass tube,

a sloped annular cam surface formed on one of the longitudinally inner end of said sheath section of said finger-grip sleeve and the respective longitudinally outer said end of said glass tube,

and a sloped annular cam surface formed on one of the longitudinally inner end of said sheath section of said nose-forming sleeve and the respective said end of said glass tube,

at least one of said slope annular cam surfaces being formed on said one end of said glass tube,

at least one of said sloped annular cam surfaces being smoothly arcuate in longitudinal section,

at least one of said sloped annular can surfaces being formed by and as a part of an annular fire-polished rim formed on one end of said glass tube,

said annular fire-polished rim comprising a fire-polished raised annular bead, and said fire-polished bead being formed at both longitudinal ends of said glass tube,

both of said sleeves sheaths having a laterally outwardly extending annular enlargement section at and in substantial lateral encompassing relation with the respective annular fire-polished end bead on said glass tube,

said finger-grip sheath annular enlargement being a fillet connecting with an annular finger-grip section, and

said annular enlargement on said nose forming sleeve forming a raised ring disposed in spaced relation from the opposite longitudinal ends of its respective said sheath section.

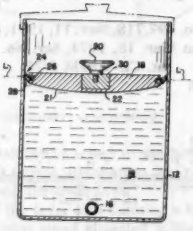
3,987,941
PRESERVING CONTAINER FOR LIQUID FOOD SUBSTANCES

Alfred V. Blessing, 2919 Lake St., Curran, Mich. 48728

Continuation-in-part of Ser. No. 424,676, Dec. 14, 1973, abandoned. This application Aug. 29, 1975, Ser. No. 608,963

Int. Cl.² B65D *25/10*

U.S. Cl. 222—386 **9 Claims**



1. A container for the preparation and preservation of a heated liquid, comprising:

a cylindrical type container in which the liquid is heated;

means for removing portions of the liquid from the container as it is being used;

a follower lid operable to remain at the upper layer of the liquid as it is being removed from the container, said lid having a weight mounted in it proximate its central portion for maintaining it partially submerged relative to the upper layer of said liquid; and

a deflectible seal mounted around the periphery of the lid, said seal having a tapered outer skirt portion with its free end extending upwardly and positioned between the periphery of the lid and the inner surface of the container, said tapered portion, further viewed in cross section, having a first arcuately shaped inner curved portion, said first curved portion having a center of rotation positioned on a line connecting the terminal edges of said tapered portion, and a second arcuately shaped outer curved portion of said tapered portion, said second curved portion being substantially radially larger than the first and further having its center of rotation likewise mounted on said line.

3,987,942
DISPENSING CAP FOR USE WITH AEROSOL CONTAINERS AND HAVING A SEPARABLE ACTUATING HANDLE

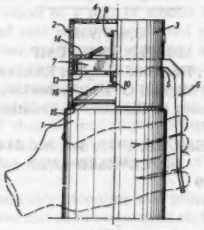
Bruno Morane, Paris, and Daniel Goyet, Romainville, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Filed May 27, 1975, Ser. No. 580,970

Claims priority, application France, June 26, 1974, 74.22214

Int. Cl.² B65D *83/14*

U.S. Cl. 222—402.15 **18 Claims**



1. In a dispensing cap adapted to be associated with a pressurized container which container comprises a dispensing valve, said cap comprising movable means defining a duct adapted to fit on the outlet of the valve, a lateral external wall defining at least one orifice, and a separate, removable actuating member adapted to be inserted through said orifice into said cap and cooperate with the movable duct to produce a movement thereof capable of causing the dispensing valve to be opened, when said actuating member is operated, the improvement according to which the actuating member, after introduction into the cap, comes to bear against said movable means and said cap comprises internal guide means positioned on opposite sides of said movable means to guide said actuating member as it is inserted into said cap, said guide means extending in the same general direction as that in which the actuating member is inserted and being positioned on opposite sides of said orifice in the external wall of the cap.

3,987,943
DETACHABLE POURING FUNNEL FOR CONTAINERS

Roy H. Richmond, Jr., Wellsburg, W. Va., assignor to Eagle Manufacturing Company, Wellsburg, W. Va.

Filed Apr. 11, 1975, Ser. No. 567,417

Int. Cl.² B65D *25/48;* **B67C** *11/00*

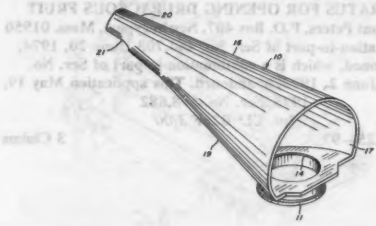
U.S. Cl. 222—570 **8 Claims**

1. A detachable pouring funnel for use with a dometop, liquid storage container having an upwardly projecting cylindrical spout, said spout provided with closure means and

having an annular groove formed in the outer periphery thereof, said funnel comprising:

a body portion having a generally frusto-conical shape, the body portion being open at both ends and tapering from a wide rear opening to a narrow, generally cylindrical outlet end portion having an outlet opening;

a generally cylindrical collar portion integrally formed with and depending from the lower rear surface of the body portion and in open communication with the interior thereof, the longitudinal axis of the body portion extending laterally of the longitudinal axis of the collar portion,



the collar portion sized to be snugly and removably received over the spout of the container, the upper edge of the collar portion formed as an inwardly directed annular flange which flange engages the annular groove formed in the outer periphery of the spout when the collar portion is press-fitted over the spout, the spout extending up through the collar portion and into the interior of the body portion, the size of the rear opening of the body portion being such as to permit substantially unobstructed manual access to the container spout to permit removal or replacement of the spout closure means when the funnel is in place.

3,987,944

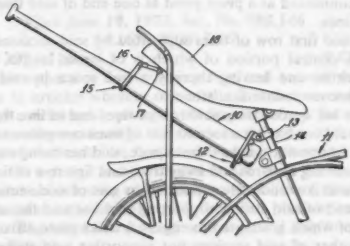
BICYCLE-MOUNTED BASEBALL BAT AND BALL CARRIER

David Shearer, Sr., 131 Maplehurst Blvd., and David Shearer, 30 Eaton St., both of Battle Creek, Mich. 49017

Division of Ser. No. 387,180, Aug. 9, 1973. This application July 21, 1975, Ser. No. 597,315

Int. Cl.² B62J 7/00

U.S. Cl. 224—37 **2 Claims**



1. A ball holder adapted to be mounted on a bicycle and to engage and retain a baseball therein, comprising a unitary wire-form structure in the form of a two-turn helix and means at the end thereof defining an integral loop formed at each end of said helix, a tubular collar disposed intermediate said loops, and a bolt disposed through said loops and said collar having an engaging nut threadingly mounted on the end thereof for mounting on said bicycle, the diameter of said turns being smaller than that of said baseball, whereby said baseball may be inserted between said wire turns and securely retained therebetween.

3,987,945

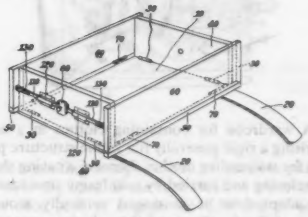
COLLAPSIBLE CONTAINER DETACHABLY SECURED TO VEHICLE SEAT

Mabel F. McDowell, Gridley, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 17, 1975, Ser. No. 568,980

Int. Cl.² B60R 7/04

U.S. Cl. 224—42.42 A **2 Claims**



1. A collapsible container for use with conventional bench-type automobile seats, comprising:

a horizontal rectangular base;

two like, opposed rectangular side walls, each side wall being hingedly attached to a corresponding side of the base in a manner that the side walls may be folded inwardly towards each other to lie flat on top of the base;

two like, opposed end strips having horizontal top surfaces, each end strip being attached to a corresponding end of the base;

two like, opposed rectangular end walls, each end wall being hingedly attached to the top surface of a corresponding end strip, in a manner that the end walls may be folded up to vertical positions to enclose the side walls between them, and may be folded inwardly towards each other to lie flat upon the side walls after the side walls have been folded to lie flat upon the base;

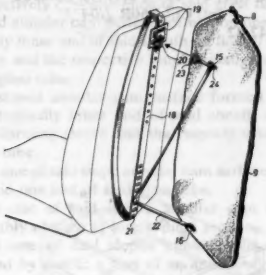
lock means disposed upon each side wall and cooperating with both end walls, in a manner that the lock means will lock all the walls into vertical orientations when locked and will leave all the walls free to be folded flat when unlocked, each lock means has a manually rotatable cam disposed on the outside surface of a corresponding side wall and each lock means further has a pair of like opposed elongated bars biased inwardly towards each cam and slidably attached to the outside surface of a corresponding side wall, each bar may be pushed outwardly away from each other by the cam as the cam is rotated and subsequently allowed to return to their original positions as the cam is further rotated; and

two like parallel flexible flat arms fixed to and extending downwardly and rearwardly from the rear end of the base, whereby the device may be detachably secured to a conventional bench-type automobile seat by placing the arms in the space between the back and the bottom of the seat.

3,987,946
WARDROBES

Börje Haglöf, Skulptorvagen 26, S-121 43 Johanneshov, Sweden

Filed July 12, 1974, Ser. No. 487,894
Claims priority, application Sweden, July 16, 1973, 7309929
Int. Cl.² B60R 9/00
U.S. Cl. 224—42.46 A 1 Claim

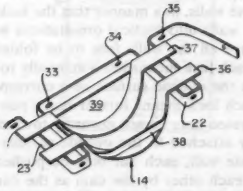


1. A wardrobe for containing clothes in a motor vehicle comprising a rigid generally flat frame structure provided with means for suspending clothes thereon, a casing shaped as a flat bag enclosing and carried by said frame structure, a first strap being adapted to be tensioned vertically around the back support of the front seat of the vehicle, a second strap connected to said strap and to said frame structure at two vertically aligned points the back support of the front seat of the vehicle to retain the frame structure with the casing at the rear side of said back support with one side of the bag in continual close engagement therewith, the opposite side of the casing having a closable opening for access to its interior and having a band attached at its ends to the inside of the casing adjacent both sides of the opening, the band extending around the frame and having a length somewhat less than the corresponding circumferential dimension of the bag between the attachment points of the band whereby when the opening is closed, the tension band is tightened around the frame and the contents of the wardrobe.

3,987,947
TIRE MOUNTING KIT

Joseph A. Della Pella, 1134 Blackberry Terrace, West Sunnyvale, Calif. 94087

Filed Feb. 27, 1975, Ser. No. 553,674
Int. Cl.² B62D 43/02
U.S. Cl. 224—42.06 5 Claims

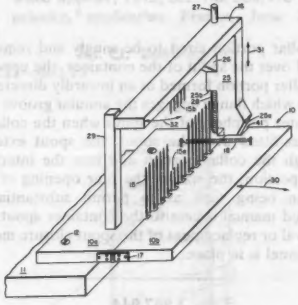


1. A kit for mounting a spare tire between the rear of a vehicle having a frame and side fenders and the rear bumper of the vehicle comprising a bumper support having spaced U-shaped extending portions adapted to have the bright portions secured to the vehicle frame and the legs extending rearwardly therefrom and side portions which extend forwardly from the outer ends of the legs and being adapted to be secured to the side fenders, said bumper support including means for receiving and securing the bumper whereby the bumper is supported spaced from the rear of the vehicle, a well supported between said U-shaped portions of said bumper support for receiving and supporting the spare tire, said well being disposed between the rear of the vehicle and the bumper, and means secured to and extending from the rear of the vehicle to engage said spare tire and hold said tire in said well.

3,987,948
APPARATUS FOR OPENING DRUPACEOUS FRUIT

Lester Grant Peters, P.O. Box 407, Newburyport, Mass. 01950

Continuation-in-part of Ser. No. 464,703, June 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 320,458, June 2, 1973, abandoned. This application May 19, 1975, Ser. No. 578,882
Int. Cl.² B26F 3/00
U.S. Cl. 225—97 3 Claims



2. Apparatus for opening a drupe having a stone, comprising

a. a working platform supporting a first row of tines, said platform being split along the line of said tines into right and left sections so mating that approximately every other of said tines are supported by one of said sections and the balance by the other section, said sections being pivotedly connected at a pivot point at one end of said first row of tines,

b. said first row of tines supported by said sections having a central portion of which is of lesser length than on either end leaving thereby a free space in said row to accommodate said stone,

c. a bar spaced from said row of tines and in line therewith, said bar having a second row of tines complementary and in opposition to said free space, said bar being capable of moving towards and away from said first row of tines, and

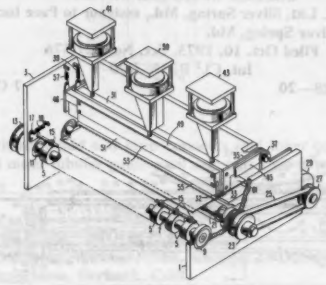
d. a striker slideably supported by one of said sections, one end of said striker supporting said bar and the other end of which is adapted to engage a strike plate affixed to the other of said sections not supporting said striker at the end opposite said pivot point, said striker being adapted to place said bar in a position close to said first row of tines with said second row of tines in position to pierce said drupe impaled on said first row of tines with said stone thereof approximately centered in said free space, and said striker forcing said right and left sections to pivot apart at said pivot point by engaging said strike plate when said bar is moved into said position close to said first row of tines and tearing apart said drupe so impaled on said first row of tines.

3,987,949

FORMS BURSTING APPARATUS

Donald Franklin Manning, Endicott; Frederick William Singer, Binghamton, and Joseph James Student, Apalachin, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,158
Int. Cl.² B65H 35/10
U.S. Cl. 225—106 4 Claims



1. Forms bursting apparatus comprising, in combination,
means for moving along a path a web having transverse preweakened tear zones therein to permit separation of said web into sheets,
a stationary brake plate across which the web is passed,
a brake bar reciprocable between an inoperative and an operative position, said brake bar gripping the web against said brake plate when in its operative position,
a burster roll over which said web passes, said roll rotating in the direction of travel of the web,
a burster bar operative between a first position and a second position, said bar comprising said web against said burster roll when in said second position, and
means for sequentially operating said brake bar and said burster bar.

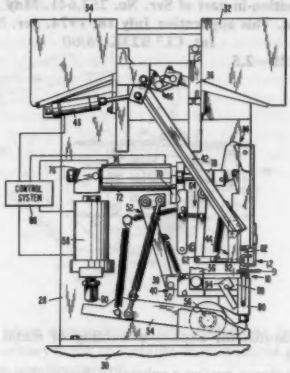
3,987,950

APPARATUS FOR ORIENTING AND ATTACHING FASTENERS TO AN ARTICLE

Erich A. Schmidt, and Volker E. Schmidt, both of Lexington, Ky., assignors to Textron, Inc., Providence, R.I., a part interest

Filed June 19, 1975, Ser. No. 588,146
Int. Cl.² B27F 7/00
U.S. Cl. 227—116 8 Claims

1. In an apparatus for attaching first and second mating elements to articles wherein one of the first and second elements has a deformable prong extending therefrom for securing the one element through the article to the other of the first and second elements, the first element having a round head portion with a design to be oriented on the front of the head portion and an orienting projection on the back of the head portion adjacent the periphery of the head portion; an improved arrangement for feeding and orienting the first element comprising
means forming a slide path for the first element,
a pusher for engaging and pushing the first element along the slide path,
a pair of members disposed on opposite sides of the slide path,
a first member of said pair of members having high friction means and the second member of said pair of members having low friction means, said high and low friction means extending along respective opposite sides of the slide path,
means biasing at least one of the high and low friction means to engage the head portion on opposite sides of its periphery between the high and low friction means such as to rotate the first element as the first element is pushed down the slide path, and



ledge means extending along one side of the slide path and partially over the back of the first element while moving down the slide path to engage the orienting projection and prevent further rotation of the first element such as to orient the first element to a predetermined orientation.

3,987,951

UPRIGHT STAPLER

Steven E. Thornhill, Menlo Park, Calif., assignor to Gail M. Thornhill, Riverside, Ill.

Filed Nov. 5, 1975, Ser. No. 629,203
Int. Cl.² B25C 5/02
U.S. Cl. 227—120 6 Claims

1. A stapler comprising: a pair of elongated members, each member having first and second ends; means pivotally mounting the first ends of the members together to permit the members to move toward and away from each other; means coupled with the members for biasing the same in a direction away from each other, one of said members having an anvil at its second end and the other member having a staple dispensing mechanism at its second end, the mechanism being aligned with the anvil and operable to dispense a staple toward and against the anvil when the members are moved toward each other, whereby sheet material placed between the members can be stapled; and leg means mounted on one of the ends of each member for supporting the members in an upright position when the leg means engages a surface therebelow.

3,987,952

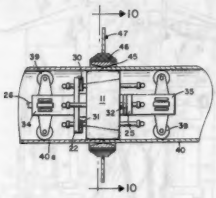
APPARATUS FOR EXPLOSIVE WELDING OF HOLLOW CYLINDERS SUCH AS PIPE

Robert H. Wittman, Littleton, and William G. Howell, Lakewood, both of Colo., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 252,641, May 12, 1972, abandoned. This application July 18, 1974, Ser. No. 489,523

Int. Cl.[2] B23K *28/00*

U.S. Cl. 228—2.5 23 Claims



1. Apparatus for explosive welding of metal pipe which comprises:

a metal sleeve having a substantially circular outer surface, a center inner surface contacting abutting ends of two pipe section ends at points adjacent the ends of said two pipe sections and substantially equidistant from the ends of said sleeve, and first and second inner surfaces tapering outwardly from said center inner surface and arranged to provide equal angles with abutting ends of two pipe sections when the sleeve is placed thereof, said sleeve having a greater thickness at the center than at its ends; and

an explosive mass placed circumferentially on said cylindrical sleeve, said explosive mass comprising a high explosive having a detonation velocity of from about 15,000 feet per second to about 30,000 feet per second which is shaped to have a greater thickness at its center than at its ends so that on detonation maximum explosive impact is exerted inwardly toward said sleeve.

3,987,953

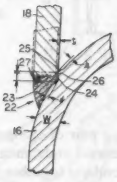
WELDMENT FOR BULLDOZER BLADES AND METHOD AND APPARATUS THEREFOR

Thomas P. Casey, Burlington, Iowa, assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 469,337, May 13, 1974, Pat. No. 3,921,728. This application Feb. 28, 1975, Ser. No. 554,246

Int. Cl.[2] B23K *31/02*

U.S. Cl. 228—166 2 Claims



1. A method for making a weldment in bulldozer blades and the like providing for the prevention of blow-through of hot weld metal through the weld-joint during welding wherein an arcuate metallic first member is secured to a metallic second member having a planar end section by a weld consisting of the steps of

simultaneously forming an elongated groove of predetermined depth below the surface of said first member, and forming an elongated dam of predetermined height above said surface in contiguous relationship with respect to said groove,

disposing a corner of the planar end of said second member within said groove and at least closely adjacent to said dam, and

welding the corner of said second member to said first member at said groove.

3,987,954

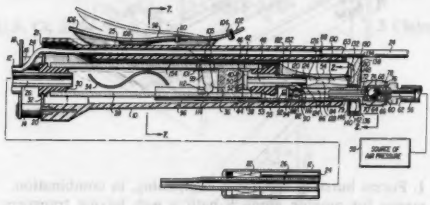
SOLDER REMOVAL DEVICE

Kenneth C. Litt, Silver Spring, Md., assignor to Pace Incorporated, Silver Spring, Md.

Filed Oct. 10, 1975, Ser. No. 621,576

Int. Cl.[2] B23K *3/00*

U.S. Cl. 228—20 7 Claims



1. A solder removal device comprising

a hollow handle having an opening disposed therein;

means for applying air under pressure to said handle;

a Venturi means disposed within said handle, said Venturi means having a first opening for receiving said air under pressure, a second opening and a third opening;

a solder collection chamber disposed substantially entirely within said handle and connected to said second opening of said Venturi means, said solder collection chamber tending to heat said handle due to hot air and solder sucked therein thereby rendering it difficult for an operator to hold the handle;

tubular means extending outside of said handle and in communication with said solder collection chamber; and

means for directing air discharged from said third opening of said Venturi means past said solder collection chamber through said hollow handle and out said opening in the handle to thereby remove heat from said solder collection chamber generated by said hot air and solder sucked through said tubular means so that said tendency for the handle to heat is substantially lessened.

3,987,955

BIPARTITE BOX AND BLANK FOR MANUFACTURING THE SAME

Martti Saarinen, Tampere, Finland, assignor to Oy Tampella AB, Finland

Filed Sept. 24, 1975, Ser. No. 616,243

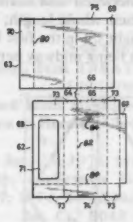
Claims priority, application Finland, Sept. 27, 1974, 2829/74

Int. Cl.[2] B65D *5/38*

U.S. Cl. 229—20 11 Claims

1. A bipartite box comprising an inner container and an outer tubular guide surrounding and engaging said inner container and supporting the latter for slidable movement with respect to said guide, said tubular guide being open at one end, and a tear strip extending across the other end of said tubular guide, said tear strip having a pair of opposed edges one of which is at least partly integral with a wall of said

tubular guide at said other end thereof and the other of which is at least partly integral with an end wall of said inner container, whereby said tear strip connects said inner container with said outer tubular guide until said tear strip is removed.



3,987,956

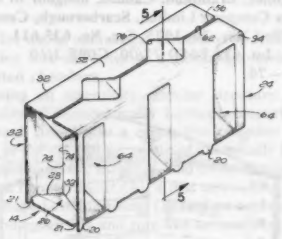
CONTAINER

Wayne Congleton, Whittier, Calif., assignor to Dolco Packaging Corporation, Burbank, Calif.

Continuation-in-part of Ser. No. 343,605, March 21, 1973, Pat. No. 3,868,054, which is a continuation-in-part of Ser. No. 273,558, July 20, 1972, Pat. No. 3,834,609. This application Dec. 26, 1974, Ser. No. 536,504

Int. Cl.² A01G 9/10

U.S. Cl. 229—28 R **2 Claims**



1. A container assembly comprising:

a blank formed with side sections and with a center section which interconnects said side sections by hinge lines defining the lower edges of said side sections and which enable said blank to be folded into a predetermined shape having a U-shaped cross-sectional configuration;

a plurality of cut-out tabs spaced along each of said hinge lines, alternating with lines of weakness therealong, each tab being formed from a portion of material of the center section of said blank adjacent one of said hinge lines and leaving an opening in said adjacent center section material whereby said tabs extend downwardly from said container, when assembled, to elevate said center section above a surface upon which the container rests;

a plurality of hollow ribs formed by indentations in said blank, opposing pairs of said ribs being spaced along the axis of said container to divide said container into a plurality of discreet compartments when said blank is folded along said hinge lines, at least one of said cut-out tabs being located in each of said compartments; and

a plurality of lids which fold along lines of weakness along the outer edges of said side structure, said lids being notched to allow the material contained therein to protrude partially from the container assembly.

3,987,957

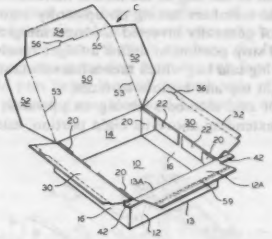
ONE PIECE SIMPLEX CARTON

Fred J. Johnson, Long Beach, Calif., assignor to Container Corporation of America, Chicago, Ill.

Filed Oct. 31, 1975, Ser. No. 627,594

Int. Cl.² B65D 5/24

U.S. Cl. 229—31 FS **4 Claims**



1. In a one piece carton having tray and cover portions formed from a unitary blank of foldable sheet material such as paperboard, the combination of:

a. a tray portion including a bottom wall, opposed pairs of front and rear side walls and end walls upstanding therefrom, and gusset means interconnecting said side and end walls at the corners of said tray portion to form a box-like structure open at the top;

b. said end walls each including an outer panel foldably connected at its lower edge to a side edge of said bottom wall and an inner panel foldably connected at its upper edge to an upper edge of said outer panel and extending downward toward said bottom wall;

c. said front side wall including an outer panel foldably connected at its lower edge to a front edge of said bottom wall and an inner panel foldably connected at its upper edge to an upper edge of said outer panel and extending downward toward said bottom wall and being adhesively secured to said outer panel;

d. said gusset means each including a pair of gusset elements foldably connected to adjacent edges of a side and end wall respectively, at a corner of said tray portion;

e. the gusset elements which are connected to said end walls being folded inwardly thereagainst and having extensions which are adhesively secured between the inner and outer panels of said end walls;

f. said end wall gusset extensions being long enough to have end portions which extend beyond the upper edges of said front and rear side walls when the carton is in a collapsed condition to facilitate the application of adhesive;

g. said rear side wall comprising a single panel being foldably connected at its lower edge to a rear edge of said bottom wall;

h. said cover portion including a top wall foldably connected at its rear edge to an upper edge of said rear side wall, a front flap, and a pair of side flaps foldably connected at their upper edges to front and side edges of said top wall and disposed to lie against the surfaces of said front side wall and said end walls respectively, when the carton is closed.

3,987,958

HOOK AND HANDLE COMBINATION

Seymour Kamins, Oceanside, and Frederick M. Shapiro, Levittown, both of N.Y., assignors to CTP Industries, Inc., Brooklyn, N.Y.

Filed Aug. 15, 1975, Ser. No. 605,119

Int. Cl.² B65D 33/06, 33/14, 33/24

U.S. Cl. 229—54 R **1 Claim**

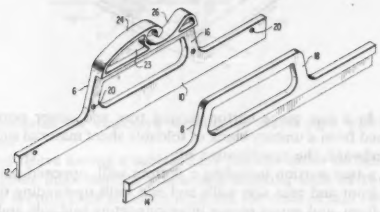
1. In a carrier bag having front and rear walls formed of a

thin-film thermoplastic material, the improvement comprising:

a combined handle and closure means for said bag including first and second members each formed of a flexible material having a thickness and tensile strength substantially greater than that of the thin-film material forming the bag walls, each said member having an elongate generally planar strip portion for attachment to a respectively opposite wall of the bag at the mouth thereof,

each of said members having an upwardly extending bow portion of generally inverted U-shape integrally formed with said strip portion to define a finger-receiving recess for carrying said bag which recess has substantially parallel straight top and bottom surfaces,

only one of said members having an upwardly extending portion extending above its bight portion, said upwardly



extending portion being of convex curvature and further defining a generally J-shaped slot having an open mouth at its top edge and a shank portion slanting downwardly and centrally from said open mouth toward a base portion of said slot, said shank portion then extending upwardly toward but terminating short of the top edge of said upwardly extending portion, the other of said members having its bight portion formed of a narrow strip of said material having generally parallel top and bottom edges,

said upwardly extending portion of said one member having a thickness which is approximately twice the thickness of said other member,

whereby the mating of said two members provides a combined handle and closure means having generally smooth external surfaces,

and means for releasably engaging said two members.

3,987,959

PLASTICS CARRIER-BAG

Henry Charles Deards, and Nigel Evans Pickford, both of Welwyn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Aug. 12, 1974, Ser. No. 496,810

Claims priority, application United Kingdom, Sept. 19, 1973, 43898/73

Int. Cl.² B65D *33/02*

U.S. Cl. 229—54 R **6 Claims**

1. In a carrier-bag of flexible sheet material formed from a substantially rectangular sheet of said material by folding and seaming, the bag comprising, in its flattened, empty state

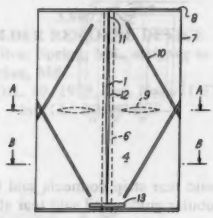
1. a substantially rectangular back panel;

2. two front panels lying upon the back panel, each joined along one edge to one of a pair of opposite edges of the back panel, and each front panel extending at least a major part but not substantially more than half of the distance between said opposite edges;

3. an extension of the edge of each front panel opposite the said joined edge, each extension being backwardly folded upon and substantially covering the front panel and each being itself extended and folded back upon itself to form a second layer covering at least a major part of the first layer thereof;

4. seams extending along each of the two remaining edges of the back panel, said seams joining together these edges of the back panel and the corresponding side edges of the front panels and extension thereof, the remaining edges and folds extending between said seams and being free across substantially their whole length;

5. a handle cut as a straight slit in the first layer only of each said extension, the slit being midway between and parallel



with said seams, and ending short of the fold joining the two layers of said extension;

the improvement consisting in that in each front panel extension the two layers thereof are joined together by heat-seals extending obliquely at least partly across each corner of the bag, the two heat-seals at each end of the bag intersecting one another at or just in advance of the fold between the two layers of the front panel extension.

3,987,960

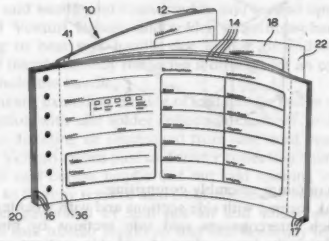
SHIPPING FORMS AND ENVELOPE

Alec R. Gardiner, Brampton, Canada, assignor to Metro Toronto News Company Limited, Scarborough, Canada

Filed Nov. 26, 1975, Ser. No. 635,611

Int. Cl.² B65D *27/00*; G09F *3/10*

U.S. Cl. 229—74 **9 Claims**



1. A shipping form for a parcel item, comprising:

a label intended to be adhered to the parcel item, the label including two superposed layers joined at three edges to form an envelope enclosure, one of said layers having adhesion means on its outer face, the other layer being adapted to display the destination of the parcel item,

a plurality of sheets superposed over said other layer with a copy-producing layer between each pair of adjacent sheets and between the label and the next adjacent sheet, at least one of said sheets being intended to accompany the parcel item,

and severable means retaining the sheets and the label in superposed relation, the label being connected to the sheets through said other of said layers, the latter having a marginal portion which is defined by a line of perforations, said marginal portion being attached to similar marginal portions of said sheets, likewise defined by lines of perforations, whereby all marginal portions may be removed from their respective label or sheets by tearing.

the marginal portions and lines of perforations constituting said severable means;

whereby the sheet intended to accompany the parcel item may be severed at its line of perforations and inserted in the envelope enclosure defined by the label.

3,987,961

CENTRIFUGE BAG FOR TREATMENT OF BIOLOGICAL LIQUIDS

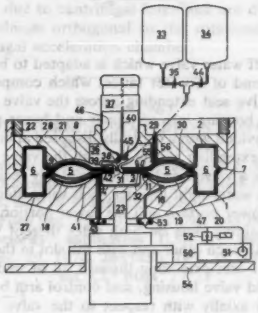
Hartmut Sinn, and Hans Stallmann, both of Osterode, Germany, assignors to Heraeus-Christ GmbH, Osterode, Germany

Filed Jan. 23, 1975, Ser. No. 543,490

Claims priority, application Germany, Jan. 29, 1974, 2404036; Feb. 21, 1974, 2408206; Aug. 31, 1974, 2441824

Int. Cl.² B04B *15/06*

U.S. Cl. 233—27 **6 Claims**



1. Bag for use in centrifugal treatment of biological liquids, for insertion into the rotor of a centrifuge having concentrically located chambers,

comprising an essentially circular structure formed in a plurality of concentrically located compartments (**3, 5, 6**), each fitting into a respective chamber of the rotor (**20**) of the centrifuge, made of chemically inert, flexible collapsible plastic material, said compartments forming a central compartment (**3**), a first surrouding intermediate ring-shaped compartment (**5**) and an outer compartment (**6**) concentrically and ring-like surrounding the intermediate compartment (**5**);

communicating duct means (**30, 41**) hydraulically connecting said compartments;

and a dimensionally stable body (**8**) of chemically inert plastic material within said bag in essentially disk-shaped form, with an intermediate bulge, secured to the upper and lower walls of the bag at selected locations and leaving free spaces between the bag and said body, at least some of said free spaces forming said communicating ducts (**30, 41**).

3,987,962

MULTI POSITION RAIL FASTENINGS

Montague Albert Robbins, Backwell, England, assignor to Resilient Grip Limited, Bristol, England

Filed June 23, 1975, Ser. No. 589,550

Claims priority, application United Kingdom, July 13, 1974, 31114/74

Int. Cl.² E01B *9/46*

U.S. Cl. 238—287 **14 Claims**

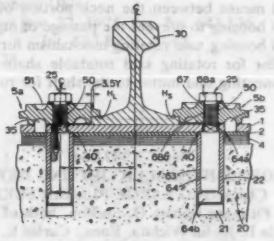
1. A rail fastening arrangement for securing a flat bottom rail on a foundation having preformed holes therein comprising in combination:

a. a base plate having a top face on which the flat bottom of the rail is adapted to rest and means for securing the base plate to the preformed holes in the foundation;

b. a pair of rail clips one on each side of the rail and each having a topmost surface and a bottom surface;

c. bolt anchorage means for fastening the clips to the base plate passing through a bolt aperture in each clip, the bolt anchorage means having a threaded shank portion engaged in a preformed bolt hole in the base plate and a head extending above the topmost surface of the clip to be easily accessible for tightening the bolt anchorage means;

d. the topmost and bottom surfaces of each clip having defined therein at least two recesses which are symmetrically spaced about the bolt aperture, the base plate having two pins upstanding from the top face thereof, each of said pins being located on each side of the rail foot, each pin being received and located in one of the clip recesses;



e. said recesses being located on said clips such that the bottom surface of each clip is engageable with the base plate top face with the clip recesses receiving the base plate pins so that said clip is engageable with the base plate in at least two alternative dispositions;

f. a rail foot abutting and clamping shoulder on each clip corresponding to each recess, one of which rail foot abutting and clamping shoulders faces inwardly towards the rail foot for each alternative disposition of the clip with respect to the base plate;

g. and each rail foot abutting and clamping shoulder being spaced from the center of each clip a predetermined distance, with the predetermined distances each being different.

3,987,963

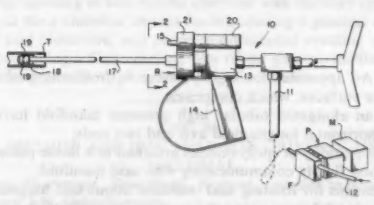
FLUID DELIVERY SYSTEM

Amos Pacht, Houston, Tex., assignor to Partek Corporation of Houston, Houston, Tex.

Filed June 27, 1975, Ser. No. 591,100

Int. Cl.² B05B *3/02, 3/18;* **B08B** *3/02, 9/04*

U.S. Cl. 239—124 **15 Claims**



1. A fluid delivery system for delivering fluid at a relatively high pressure from a fluid source to an object to be cleaned, comprising, in combination:

a high pressure pump including in inlet adapted to be connected to said fluid source, and an outlet;

dump valve means including an inlet connected to said outlet of said pump, a relatively high pressure fluid outlet, a relatively low pressure dump outlet, and means for

directing fluid from said inlet between said high pressure fluid outlet and said dump outlet;

a cleaning mechanism including at least one outlet nozzle for directing cleaning fluid against the object to be cleaned; and

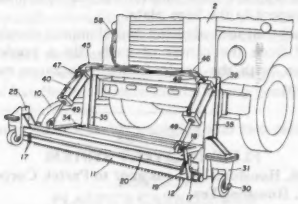
a rotating mechanism connected between said high pressure fluid outlet and said cleaning mechanism for permitting rotation of said cleaning mechanism while conducting said relatively high pressure fluid from said dump valve means to said outlet, said rotating mechanism including a rotator having a stationary housing with a fluid inlet, a rotatable shaft having an internal fluid passageway extending from said inlet and through the housing, said shaft including an elongated neck portion of relatively small diameter extending into said fluid inlet, and a large diameter main body portion, bearing means disposed in said housing to rotatably mount said shaft in said housing, and seal means between the neck portion of said shaft and said housing to prevent the passage of high pressure into said housing, said rotating mechanism further including a motor for rotating said rotatable shaft and means for connecting said motor to the shaft for rotation thereof.

3,987,964

MOBILE HYDRAULIC JETTING DEVICE FOR CLEANING LARGE PLANAR SURFACES

Forrest Pittman; Robert Q. Shelton, both of Duncan, Okla.; Marvin L. Klein, Wichita, Kans.; Carlos E. Gutierrez, Harvey, La., and William F. White, Jackson, Miss., assignors to Halliburton Company, Duncan, Okla.

Filed June 29, 1973, Ser. No. 374,842
Int. Cl.² B05B 1/14
U.S. Cl. 239—169 **22 Claims**



1. An apparatus for high pressure hydrocleaning of large planar surfaces, which comprises:

a. an elongated tubular high pressure manifold having a horizontal longitudinal axis and two ends;

b. a plurality of spray nozzles attached in a linear pattern to and fluidly communicating with said manifold;

c. means for rotating said manifold about said longitudinal axis while measuring the angle of such rotation;

d. means for transporting said manifold along the planar surface;

e. means for mounting said manifold on said transporting means;

f. means for highly pressurizing water and communicating highly pressurized water to said spray nozzles; and

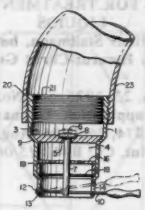
g. means, communicating with said pressurizing means, for supplying large quantities of water thereto.

3,987,965

WATER VALVE

Anthony R. Puma, Curlew & Fisher Roads, Palm Harbor, Fla. 33563

Filed Apr. 30, 1975, Ser. No. 573,368
Int. Cl.² B05B 1/30
U.S. Cl. 239—583 **12 Claims**



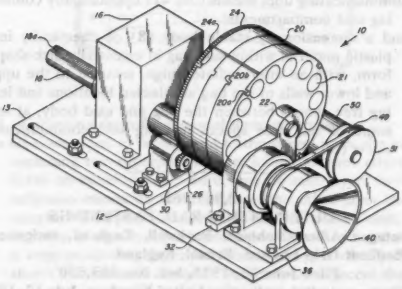
1. An on-off water valve which is adapted to be removably fixed to the end of a water faucet which comprises a valve housing, a valve seat extending across the valve housing and dividing said housing into an upper and lower portion, said valve seat provided with a centrally disposed aperture therein, a valve stem extending axially through the valve housing and provided with a valve head which is slidably received by said aperture in a water-tight manner, said valve stem containing a slot in its lower portion and the lower portion of the valve housing containing slots on both sides thereof which are in alignment with each other and with the slot in the valve stem, and a control arm extending through all of said slots to the outside of said valve housing, said control arm being adapted to be moved axially with respect to the valve housing, the valve head being seated or unseated in the valve seat depending upon the direction of movement of said contol arm.

3,987,966

CENTRIFUGAL CHAFF DISPENSER

Ernest V. Ruda, East Amherst; John E. Blickenstaff, Tonawanda, and Clayton J. Schneider, Jr., East Aurora, all of N.Y., assignors to Calspan Corporation, Buffalo, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,421
Int. Cl.² A01C 17/00
U.S. Cl. 239—687 **9 Claims**



1. A method of dispensing chaff fibers including the steps of:

feeding chaff fibers to a rotating preacceleration chamber wherein centrifugal force forces the chaff fibers radially outward; and

causing the chaff fibers to pass from the rotating preacceleration chamber to a rotating centrifugal acceleration chamber having a diverging outlet whereby chaff fibers

entering the centrifugal acceleration chamber are forced outwardly due to centrifugal force and are dispensed at an angle almost orthogonal to the rotational axis of the centrifugal acceleration chamber.

7. A centrifugal chaff dispenser comprising;

means defining a tapered preacceleration chamber and a coaxial centrifugal acceleration chamber having a diverging outlet;

means for causing said means defining a preacceleration chamber and a centrifugal acceleration chamber to rotate and to thereby produce a centrifugal force in said chambers;

chaff fibers; and

feed means for feeding said chaff fibers to said preacceleration chamber wherein said chaff fibers are subjected to centrifugal force and, due to the tapering of said preacceleration chamber, are forced radially and axially outward whereby said chaff fibers are caused to enter said centrifugal acceleration chamber and are forced outwardly due to centrifugal force and are dispensed at an angle almost orthogonal to the rotational axis of said centrifugal acceleration chamber.

3,987,967
METHOD OF WORKING MATERIALS AND DEVICE FOR EFFECTING SAME

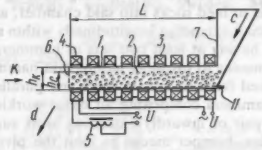
Jury Nikolaevich Kuznetsov, prospekt Lenina, 55, kv. 45, and Vladimir Alexandrovich Abrosimov, ulitsa Krasnoborskaya, 1a, kv. 43, both of Yaroslavl, U.S.S.R.

Filed Dec. 15, 1975, Ser. No. 641,085

Claims priority, application U.S.S.R., Dec. 19, 1974, 2081453; Dec. 19, 1974, 2081454; Dec. 19, 1974, 2081455

Int. Cl.² B02C *17/24*

U.S. Cl. 241—1 **15 Claims**



1. A method for processing materials, whereby in the space defined by an electric winding there is placed a chamber containing a plurality of magnetic elements of a magnetically hard material, which elements form a layer whose height is selected within the following limits:

$$2a < h_c < 2 \cdot 10^{-3} \frac{B_r \cdot {}_iH_c}{\rho \cdot g},$$

where

a is the mean size of the magnetic elements, cm;

h_c is the height of the layer of magnetic elements, cm;

B_r is the remanent induction of the magnetically hard material, gausses;

${}_iH_c$ is the coercive magnetization force of the magnetically hard material, oersteds;

ρ is the density of the magnetically hard material, g/cm³;

g is the acceleration of gravity, cm/sec²;

whereupon a material to be processed in charged into said chamber, and a variable magnetic field is produced in the space where said chamber is located, the amplitude of said field's intensity being selected within the following limits:

$$10^2 \frac{\rho \cdot a^2 \cdot f^2}{B_r} < H_o < 0.8 \, {}_iH_c$$

where

f is the frequency of the magnetic field, Hz; and

H_o is the amplitude of the intensity of the magnetic field, oersteds;

after which the material placed in the chamber is acted upon by chaotically moving magnetic elements whose movement is caused by the magnetic field.

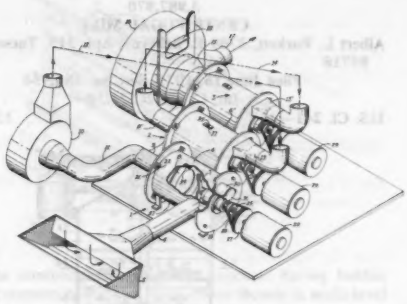
3,987,968
FLOW-THROUGH MOIST PULP FIBERIZING DEVICE

Danny Raymond Moore, Perry, Fla., and Orin Alvin Shields, Memphis, Tenn., assignors to The Buckeye Cellulose Corporation, Cincinnati, Ohio

Filed Dec. 22, 1975, Ser. No. 643,136

Int. Cl.² B27L *11/08*

U.S. Cl. 241—28 **20 Claims**



12. Apparatus for effecting the separation of fiberous agglomerates into individual fibers in a gaseous media comprising first, second and third elongated tubular chambers each having a leading end and a trailing end, an inlet opening at the leading end of each chamber and a discharge opening at the trailing end of each chamber, a fiberizing blade rotatably mounted within each chamber in spaced relation to the leading end thereof, means for rotating said fiberizing blades, orificial constricting means mounted within each said chamber intermediate said fiberizing blade and said discharge opening in cooperating fiberizing relationship with said fiberizing blade, conduit means interconnecting the discharge opening in said first chamber with the inlet opening in said second chamber, and additional conduit means connecting the discharge opening in said second chamber with the inlet opening in said third chamber, means for introducing a gaseous media into said chambers, and pressure differential creating means for producing a fiber carrying flow of the gaseous media from the leading to the trailing end of each chamber.

3,987,969
METHOD AND DISC MILL FOR GRINDING OF MATERIAL

Magne Mortenson, Trondheim, Norway, assignor to Kvaerner Brug A/S, Oslo, Norway

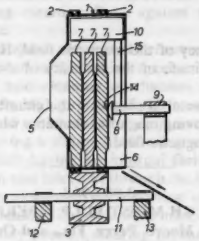
Filed Mar. 10, 1975, Ser. No. 557,176

Int. Cl.² B02C *17/10*

U.S. Cl. 241—30 **5 Claims**

1. A method of grinding material in a disc mill comprising a hollow cylinder and at least one disc in the cylinder, said at least one disc having a diameter that occupies most of the inside diameter of said cylinder, comprising introducing a charge of material to be ground into a said cylinder, rotating

the cylinder at a speed such that centrifugal force holds the material in a layer on the inner surface of a wall of the cylinder



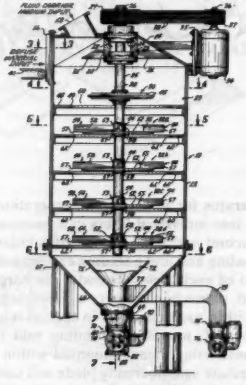
throughout rotation, and removing a portion only of the thickness of said layer of material after said layer has passed between said wall and said disc.

3,987,970

CENTRIFUGAL MILL

Albert L. Burkett, 3700 E. Bellevue, Apt. 313, Tucson, Ariz. 85716

Filed June 16, 1975, Ser. No. 586,954
Int. Cl.² B02C *23/38*
U.S. Cl. 241—43 **13 Claims**



1. A centrifugal mill for shredding and grinding refuse materials, said centrifugal mill comprising:

a. a housing having a vertically disposed bore formed therethrough and a head section at the upper end thereof and a discharge section at the lower end thereof;

b. a refuse input port formed in the head section of said housing;

c. means in the head section of said housing for injecting a fluid carrier medium into the bore of said housing;

d. refuse shredding and grinding means rotatably mounted and coaxially disposed within the bore of said housing, said refuse shredding and grinding means comprising,

a shaft rotatably concentrically mounted in the bore of said housing,

pre-breaker means affixed to said shaft for rotation therewith, said pre-breaker means located adjacent the head section of said housing for initially impacting the refuse material and the fluid carrier medium upon feeding thereof into the bore of said housing, and

at least a pair of comminution means affixed to said shaft for rotation therewith, said comminution means axially spaced along the length of said shaft below said pre-breaker means and axially spaced with respect to each other for subsequently and serially impacting the refuse material and the fluid carrier medium upon emergence thereof from the proximity of said pre-breaker means;

e. means coupled to said refuse shredding and grinding means for rotatable driving thereof; and

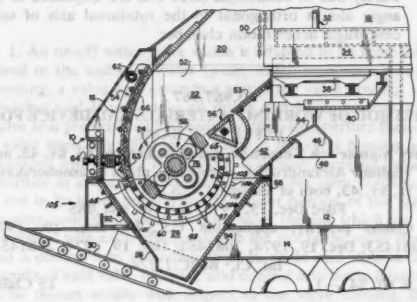
f. means at the discharge section of said housing for controlling the flow rate of refuse materials and the fluid carrier medium at a rate that is substantially equal to the rate of input of the refuse materials and the fluid carrier medium.

3,987,971

ROCK CRUSHER

Orlie Bob McClure, 25 Ellsworth Lane, St. Louis, Mo. 63124

Continuation-in-part of Ser. No. 464,814, April 29, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,866
Int. Cl.² B02C *13/04*
U.S. Cl. 241—73 **8 Claims**



1. A rock crusher comprising a housing forming a crushing chamber, means to feed rocks into said chamber, and a rotor having a main shaft extending longitudinally within said chamber, said rotor having at least two sets of hammers disposed thereon, pivot means to pivotally mount said hammers about pivot axes spaced from said main shaft and parallel thereto, each of said hammers comprising an outer working surface portion and a pair of inwardly extending arms supported at said pivot means, bumper means to limit the pivotal movement of said hammers, a first set of discs mounted on and rotatable with said main shaft, each disc having a first opposed pair of projections extending between the arms of a respective hammer and being connected thereto by said pivot means, each disc having a second pair of opposed projections, and means connecting said bumper means to said second pairs of projections.

3,987,972

CLOSURE PLATE FOR BOTTLE CRUSHER

Floyd R. Gladwin, P.O. Box 1113, South Gate, Mich. 48195

Continuation-in-part of Ser. No. 513,698, Oct. 10, 1974, Pat. No. 3,938,745. This application Nov. 21, 1975, Ser. No. 634,099
Int. Cl.² B02C *13/06*
U.S. Cl. 241—99 **4 Claims**

1. In a bottle crusher or the like, including a generally downwardly directed chute having an open upper end into which glass bottles and the like may be inserted and an open lower end for feeding the glass bottles to a rotatable impacting member which fragments the glass bottles, the improvement comprising:

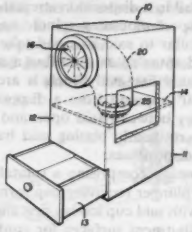
a closure plate for the open end of the chute, said closure plate formed of a plurality of sheets of relatively stiff but resilient material in adjacent face-to-face contact,

each of said sheets having a plurality of equally spaced apart slits extending radially outwardly from the center of each

sheet toward the outer edge thereof to form a plurality of flexible tongue segments;

the slits of each sheet being relatively narrow in comparison to the width of the tongues so that each sheet substantially closes the open upper end of the chute;

the slits of one sheet being offset relative to the slits of the adjacent sheet so that the tongue segments of one sheet overlap the slits of the adjacent sheet;



whereby glass bottles and the like may be pushed through the sheets due to the spreading apart of the tongue segments thereof at the slits but with the tongue segments normally remaining together to seal against glass fragments being ejected from the upper end of the chute under the influence of the impacting member.

3,987,973

DEVICE IN MACHINE ELEMENTS WITH CLOSED CASING

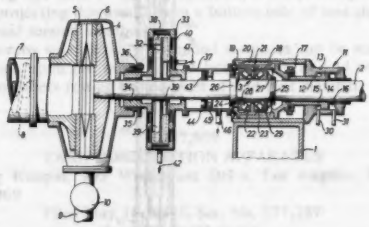
Rolf Bertil Reinhall, 834 171st. Place, NE., Bellevue, Wash. 98008

Filed Mar. 6, 1975, Ser. No. 556,146

Claims priority, application Sweden, Mar. 11, 1974, 7403203

Int. Cl.² B02C *7/16*

U.S. Cl. 241—259.2 **3 Claims**



1. In a grinding apparatus of the defibrator or refiner type including a closed casing having a pressure therein differing from that of the ambient atmosphere, at least two grinding elements located within the casing, one of the grinding elements being stationarily mounted in the casing, the other grinding element being supported on a rotatable shaft passing through the casing, and the rotatable shaft having operatively associated therewith a servo motor operated displacement piston for axially displacing the shaft relative to the casing, the improvement of liquid seal means cooperating with the shaft for sealing the interior of the casing from the ambient atmosphere comprising:

a disc rigidly secured to the shaft,

a stationary annular sealing housing surrounding the disc,

the annular sealing housing being open inwardly to contain a sealing liquid which during rotation of the shaft is conveyed by the disc to form a liquid ring,

the sealing housing being coupled to the casing,

the sealing housing being joined to the displacement piston so that it is displaced along with the shaft displacement, and

yieldable mechanical sealing means located between the casing and the sealing housing for yielding in correspondence to the housing displacement.

3,987,974

MOVABLE BOBBIN TRANSPORT APPARATUS

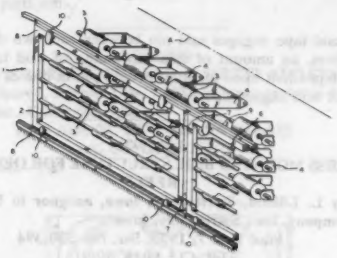
Manfred Mayer, Remscheid-Lennep, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Division of Ser. No. 252,309, May 10, 1972, Pat. No. 3,895,725. This application June 12, 1974, Ser. No. 478,531

Claims priority, application Germany, May 13, 1971, 2123689

Int. Cl.² B65H *54/20, 67/04*

U.S. Cl. 242—35.5 A **14 Claims**



1. The combination of a textile machine having bobbin winding stations positioned along a face therein in multi-level rows and spatially arranged in a predetermined geometric pattern, and a bobbin transport unit movable along said face for transportation from the winding stations of finished bobbins, said transport unit being characterized by a plurality of bobbin-receiving means for receiving respective finished bobbins discharged from said stations and spatially arranged in the same geometric pattern as said first-mentioned pattern, means for exchanging an empty bobbin for finished bobbin, and transfer means for transferring the individual finished bobbins to respective bobbin receiving means of said transport unit.

3,987,975

MAGNETIC TAPE REEL WITH STOP MEANS

Mark Jackson, New York, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Apr. 10, 1975, Ser. No. 566,947

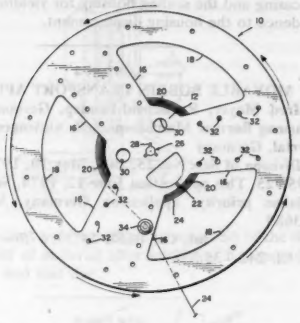
Int. Cl.² B65H *75/18*

U.S. Cl. 242—71.8 **1 Claim**

1. An improved magnetic tape reel having a hub with a slot therein for receiving one end of a magnetic tape therein and two disc side members integrally joined to said hub, an axis of each said disc member disposed in coaxial relationship to an axis of said hub, each said side member having openings therein, said opening defined by radially extending sides and an arcuate section having the center curvative thereof proximate to said axis of said hub, one said disc member having a center splined hole therein, wherein the improvement comprises:

a. each said disc having a plurality of apertures therethrough, each said aperture of one said disc member being aligned with one of said apertures of said other disc members, said apertures of each said disc member being disposed at a plurality of different radii from said axis of said hub, an axis of each said aperture being coaxially aligned with said axis of said hub;

b. a pin member, said pin member disposed in one of said plurality of a pair of said aligned apertures of said two disc members, said pin extending between said two disc members, said tape unwinding as said reel revolves until



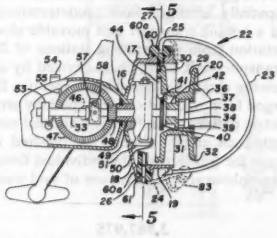
said tape engages said pin between said two disc members, an amount of said unwinding of said tape being dependent upon location of said pin in one of said pairs of said aligned apertures.

3,987,976

STRESS MOUNTED BAIL STRUCTURE FOR OPEN FACE REELS

Larry L. Lilland, Spirit Lake, Iowa, assignor to Berkley & Company, Inc., Spirit Lake, Iowa

Filed Feb. 7, 1973, Ser. No. 330,394
Int. Cl.² A01K *89/01*
U.S. Cl. 242—84.21 R **9 Claims**



1. In a spinning reel having frame means, a winding rotor assembly operatively coupled to said frame means, a resilient line engaging bail rockable between a stable open line casting mode and a stable closed line retrieval mode, stressably offset bail mounting means for inducing torsional stresses in said bail and cooperating stop means for resiliently forcing said line engaging bail into either one of said stable modes, a line spool mounting spindle and a line spool retained upon said spindle, a winding crank and associated mechanical linkages for causing said winding rotor assembly to rotate and the line spool mounting spindle to axially reciprocate the line spool for rewinding the line;

a. said frame means including a base housing assembly with said spindle means being secured thereto and being disposed generally coaxially with said rotor and with a portion of said spindle means extending generally forward of said base housing assembly for receiving said linne spool thereon;

b. said line bail comprising a generally resilient semi-circular arm with a normal relaxed disposition situated substantially 180° opposed from a disposition generally arcuately midway between said open and closed modes respectively, said arm having a predetermined radius and terminating in a pair of angularly disposed chordal leg portions, at least one of said leg portions terminating in a radially inwardly extending mounting segment;

c. said winding rotor being arranged to operatively retain said line bail and having offset opposed mounting means comprising first and second opposed hub means for receiving the terminal ends of said leg portions of said line bail and for permitting limited pivotal rotation of said terminal ends therewithin, said opposed hub means mounting said bail in a disposition stressably offset along the axis of the spool mounting spindle and also along a plane perpendicular to said axis and taken through the diameter of said rotor so as to define a normal relaxed disposition for said line bail which is arcuately spaced substantially 180° opposed from a disposition generally arcuately midway between said open and closed modes respectively for resiliently biasing said bail arm toward open or closed dispositions;

d. said first hub means comprising a rotatable plunger received within a plunger receiving cup formed within said winding rotor, with said cup having first and second angularly disposed abutment surfaces for controlling the extent of rotation of said bail between open and closed modes, motion limit means coupled to said plunger and extending radially of the axis theretof for contacting saiid abutment surfaces when said line bail is in full open or full closed dispositions.

3,987,977

SKEWER ASSEMBLY

Narottam Vrajlal Sheth, 146A Jain Society, Sion, Bombay-400 022, India

Filed Apr. 15, 1975, Ser. No. 568,372
Int. Cl.² B65H *49/02*; D03J *5/08*
U.S. Cl. 242—130.4 **13 Claims**

1. A skewer assembly comprising upper and lower tubular portions connected together and extending axially along a longitudinal axis, said upper portion having a tapered end, said lower portion having an end with bearing means for a rotatable crank pin, longitudinal cam means riding in said lower portion and actuated by the crank pin, said upper portion being provided with a plurality of longitudinal guide slots distributed around the circumference of the upper portion, holding dogs pivotably mounted on said upper portion for movement in respective guide slots in said upper portion, actuation means extending in said tubular portions and coupled to said camming means for acting on said holding dogs to pivotably move the same between extended and retracted

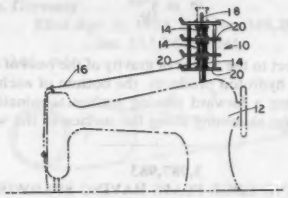
positions for selectively holding and releasing a bobbin on the skewer, each of said dogs including a first end region with a convexly bent portion with an extremity extending obliquely relative to said longitudinal axis radially inwardly and axially upwardly to form a guide for a bobbin as it is received by said skewer assembly.

3,987,978

SPOOL MAGAZINE

Alberino Alberelli, and Ida Alberelli, both of New Hyde Park, N.Y., assignors to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 14, 1976, Ser. No. 649,196
Int. Cl.² B65H *49/18*
U.S. Cl. 242—134 **2 Claims**



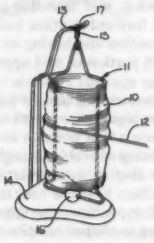
1. A magazine for supporting a plurality of spools of thread in vertically stacked relationship on top of an upstanding spool support post of a sewing machine comprising:
- a first member having a spool support shelf adapted to be oriented horizontally;
- a tubular portion projecting downward from a bottom side of said shelf for reception about said spool support post, and an elongated shaft projecting upward from a top side of said shelf for sequential passage through said spools;
- a plurality of second members each having a shelf adapted to be oriented horizontally, central apertures in said shelves of said second members dimensioned for receiving said shaft of said first member, and a plurality of legs projecting downward from a bottom side of said shelf of said second member;
- whereby said plurality of second members can be stacked one upon the other with a bottom one of said second members resting on the shelf of said first member.

3,987,979

YARN DISTRIBUTION APPARATUS

Irving Knispel, 705 Westmount Drive, Los Angeles, Calif. 90069

Filed May 14, 1975, Ser. No. 577,287
Int. Cl.² B65H *49/18*
U.S. Cl. 242—136 **5 Claims**



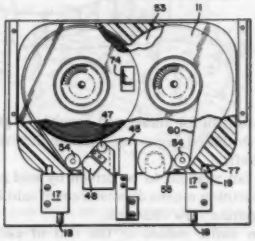
4. A yarn distribution apparatus comprising:
- a. a planar platform;
- b. a supporting arm depending upwardly from said platform and extending laterally over a portion of said platform;
- c. a supporting frame having an apex depending downwardly and laterally outwardly into a first pair of shoulder members, said shoulder members depending downwardly to a pair of parallel, spaced sections separated by a distance which is less than the distance between said first air of shoulder members, said spaced sections, at the bottom thereof, depending outwardly into a second pair of shoulder members, the distance therebetween being substantially the same as the distance between said first pair of shoulder members, said second pair of shoulder members being integral with each other at the base section of said supporting frame, said base section being adapted to be parallel to said platform, and;
- d. rotation means for coupling said yarn supporting means to said supporting arm, said rotation means suspending said yarn supporting means for said supporting arm, said pivot member slidably contacting said platform whereby said pivot member is adapted to rotate about its axis upon said platform.

3,987,980

SIMPLIFIED PRECISION TAPE CASSETTE AND SYSTEM

John D. Sperry, Nevada City, Calif., assignor to Arvin Industries, Inc., Columbus, Ind.

Filed Apr. 24, 1972, Ser. No. 246,635
Int. Cl.² G11B *23/10*
U.S. Cl. 242—199 **2 Claims**



1. A tape handling system comprising a deck including,
- a supply roll drive spindle,
- a takeup roll drive spindle,
- a capstan,
- a transducer,
- a tape guide adjacent said transducer for aligning moving tape with said transducer,
- a capstan drive connected to rotate said capstan to move tape past said transducer,
- means for rotating said takeup spindle in a direction to pull tape from said capstan and for rotating said supply spindle in a direction to withhold tape from said capstan,
- a base having said capstan, said spindles and said tape guide mounted thereon in fixed predetermined spaced relation;
- a hollow tape cassette,
- a supply roll in said cassette having a hub adapted for connection with said drive spindle,
- a takeup roll in said cassette having a hub adapted for connection with said takeup spindle,
- a length of tape fastened at its opposite ends to said hubs and wound about at least one of said hubs,
- said cassette having an opening in one edge for admitting at least a portion of said transducer and said capstan,
- means in said cassette guiding the tape from one hub to the other within said cassette across said opening,
- said opening being spaced sufficiently from the center of said rolls that the tape extending across said opening is

moved back into said cassette without contacting the tape wound on said hubs,

means on said deck forming a cavity to receive said cassette, and guide means locating said cassette in said cavity with said hubs aligned with said spindles and at least a portion of said capstan and said tape guide projecting into said cassette through said opening to form a partial loop of tape contacting a substantial section of the face of said capstan whereby there is a significant surface-to-surface tape driving contact between said capstan and said tape.

3,987,981

ROLL CONTROL FOR AIRCRAFT, PARTICULARLY FLYING BARRELS, ADAPTED TO BE DRIVEN BY MEANS OF DUCTED FANS

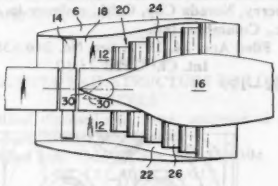
Dieter Kook, Friedrichshafen, Germany, assignor to Dornier System GmbH, Germany

Continuation of Ser. No. 521,039, Nov. 5, 1974, abandoned. This application Aug. 25, 1975, Ser. No. 607,518

Claims priority, application Germany, Dec. 20, 1973, 2363496

Int. Cl.² B64C *15/06*

U.S. Cl. 244—12 D **2 Claims**



1. A roll control for an aircraft capable of gliding, comprising a single shrouded engine mounted in the longitudinal plane of said aircraft,

a ducted fan adapted to be driven by said engine,

vertical partition means downstream of said fan and forming two separate flow channels,

deflection baffle means at the end of each of said flow channels, and roll control means comprising at least one flap means mounted on said partition means downstream of said fan and rotatable about a vertical axis for deflecting part of the flow of one of said flow channels to the other of said flow channels for effecting a rolling moment by increasing the flow over the baffle means of said other flow channel when said baffle means is inclined with respect to the horizontal.

3,987,982

WIND-POWERED FLYING BOAT

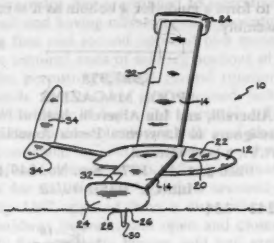
James L. Amick, 1464 Cedar Bend Drive, Ann Arbor, Mich. 48105

Continuation of Ser. No. 530,415, Dec. 6, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,386

Int. Cl.² B64C *31/02*, *35/00*

U.S. Cl. 244—16 **8 Claims**

1. A wind-powered flying boat comprising a fuselage with wings fixedly mounted thereon at a dihedral angle within the range of 10° to 45°, said fuselage defining a hull member for traveling on a surface of water, float members fixedly mounted on the outer tips of said wings in positions so that either wing will assume approximately a horizontal position when its associated float member and said hull member are immersed in bouyant positions in said water, and a hydrofoil fixedly mounted on each of the float members and projecting downward to develop a horizontal side force in opposition to the component of boat motion in the leeward direction when the boat is traveling in or skimming along the surface of said water, each said hydrofoil having its tip inclined inward from the vertical line through its root when its associated wing is horizontal at an angle sufficient so as to reduce the moment



arm with respect to the center of gravity of the boat of the side force that the hydrofoil produces, the bottom of each of said members having a forward planing surface terminating in a step for efficient skimming along the surface of the water.

3,987,983

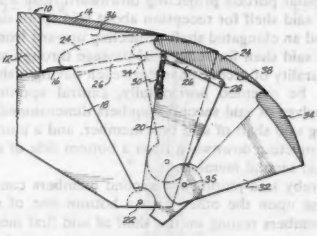
TRAILING EDGE FLAPS HAVING SPANWISE AERODYNAMIC SLOT OPENING AND CLOSING MECHANISM

James B. Cole, Mercer Island, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 20, 1974, Ser. No. 534,828

Int. Cl.² B64C *9/20*

U.S. Cl. 244—42 DB **12 Claims**



1. An aerodynamic lift enhancing apparatus comprising:

a wing having a span and an upper airfoil surface,

a first trailing edge flap having a span, a forward portion, an aft portion, and an upper airfoil surface,

a first support means associated with said wing for supporting said first flap for fore and aft swinging movement relative to said wing between a retracted position and a plurality of extended positions, said first flap in said extended positions being effective to increase the camber and chord of said wing, said first flap in said extended positions having its forward portion located rearwardly from its retracted position and having its forward portion located below the aft portion of said upper airfoil surface of said wing,

mounting means for connecting said first flap on said first support means for swinging movement about a generally spanwise axis between a first position and a second position, said first flap being movable to said second position only when said first flap is in said plurality of extended positions, said first flap when in said retracted position being only in said first position, the upper airfoil surface of said first flap being so shaped relative to the aft portion of said upper airfoil surface of said wing and being so oriented relative to said first support means as to form, when in said first position and when normally moved from

said retracted position to said plurality of extended positions, a smooth, downward and rearward, continuous extension of the upper airfoil surface of said wing, said first flap when moved to said second position being oriented such that the forward portion of the upper airfoil surface of said first flap is spaced downwardly from the aft portion of the upper airfoil surface of said wing to form a spanwise slot between the aft portion of said wing and the upper forward portion of said first flap, and

actuating means for moving said first flap between said first and second positions.

3,987,984

SEMI-RIGID AIRCRAFT WING

Albert George Fischer, Preinstr. 132, 46 Dortmund, Wellinghofen, Germany

Filed Apr. 9, 1973, Ser. No. 349,284
Int. Cl.² B64C 3/46
U.S. Cl. 244—44 7 Claims

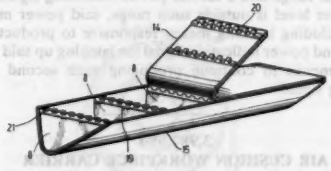
1. In an aircraft having a fuselage and wings attached thereto, each of said wings comprising a rigid spar forming the leading edge of the wing, a flexible cable forming the trailing edge of the wing, flexible covering means extending between said spar and said cable and forming upper and lower wing surfaces, and an inflatable air bag disposed within the wing between said surfaces, said air bag extending longitudinally of the wing from end to end thereof and being adapted to engage at least one of the surfaces when inflated to cause the wing to assume a desired airfoil configuration, the air bag being disposed adjacent said rigid spar and extending across the wing not more than half the chordwise width of the wing.

3,987,985

DEVICE FOR SEALING OFF FUSELAGE GAP OF AIRCRAFT

Günter Müller, Gauting, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed July 17, 1975, Ser. No. 596,620
Claims priority, application Germany, Aug. 13, 1974, 2438739
Int. Cl.² B64C 1/14
U.S. Cl. 244—46 6 Claims



1. A device for sealing a fuselage gap in a variable geometry aircraft, which gap is adapted to receive a rear inboard part of a movable wing in the swung-back position thereof, comprising:

means defining a pair of elongated, triangular-shaped, inflatable and flexible air bellows, each of said air bellows comprising a base wall and a pair of upstanding sidewalls secured to said base wall at spaced locations and to each other to thereby define a cross section that is triangular in shape;

means for securing said base wall of each of said air bellows to said fuselage in said gap, the apexes of each of said air bellows contacting one another when said wing is removed from said gap and contacting the lower and upper surfaces of said rear inboard part of said wing when said wing is in said swung-back position;

at least one partition wall inside said triangular-shaped air bellows and extending transversely to said base wall and said sidewalls of said air bellows, said partition wall having a triangular shape, each of a pair of edges on said partition wall being fixedly secured to said sidewalls of said air bellows; and

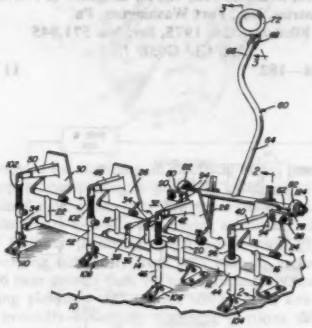
form closed means for securing a third edge of said triangular-shaped partition wall to said base wall.

3,987,986

PORTABLE AIRCRAFT HAND CONTROLS

James E. Shockley, Jr., Sturgis, Ky., assignor to Union Aviation, Inc (Entire), Sturgis, Ky.

Filed June 18, 1975, Ser. No. 587,908
Int. Cl.² B64C 13/04
U.S. Cl. 244—83 F 8 Claims



1. In combination with aircraft controls of the type including a pair of horizontally transversely spaced apart side by side right and left fore and aft shiftable rudder controlling foot pedals, a hand control member including a connecting member extending between said pedals, support means supporting spaced portions of said connecting member from said pedals for angular displacement of said spaced portions, and thus said connecting member, relative to said pedals about upstanding axes, and a control arm portion connected rigidly to and extending rearwardly and upwardly from said connecting member in a direction generally transverse to a line extending between said pedals, the free end of said control arm portion being adapted to be grasped and horizontally laterally displaced by the operator of the associated aircraft.

3,987,987

SELF-ERECTING WINDMILL

Peter R. Payne, Rte. 5 Box 282, Annapolis, Md. 21401, and Charles McCutchen, 5213 Acacia Ave., Bethesda, Md. 20014

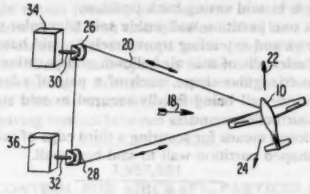
Filed Jan. 28, 1975, Ser. No. 544,617
Int. Cl.² B64C 31/06; F03D 5/00
U.S. Cl. 244—153 R 3 Claims

1. A wind driven apparatus for the production of energy comprising:

means responsive to the motion of air for maintaining a stable airborne orientation, said orientation comprising periodic oscillations through the air and said airborne orientation maintained as a result of aerodynamic lift;

coupling means for linking said means responsive to the motion of air to a ground location, said coupling means

movable in response to the oscillations of said means responsive to the motion of air; and



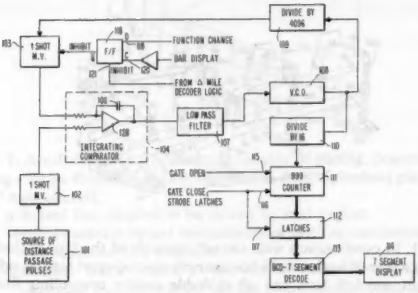
means disposed at said ground location for converting the movements of said coupling means into usable energy.

3,987,988

GROUND SPEED CALCULATION FOR DIGITAL DME

Ronald Lee Powell, King of Prussia, and Frank Patterson Smith, 2nd, Dresher, both of Pa., assignors to Narco Scientific Industries, Inc., Fort Washington, Pa.

Filed Apr. 28, 1975, Ser. No. 571,845
Int. Cl.[2] G05D *1/08*
U.S. Cl. 244—182 11 Claims



1. In a digital DME system, apparatus for developing ground speed of a aircraft comprising:

a source of pulses respectively representing passage of the aircraft through successive fractional mile distance intervals;

a voltage controlled oscillator;

first means for frequency scaling an output signal from said oscillator by a first predetermined factor;

comparator means for developing a control signal variable in amplitude and sesnse in correspondence with the frequency difference between said pulses and the frequency scaled oscillator output signal, the amplitude of said developed control signal controlling the frequency of said oscillator; and

means for counting the pulses from said oscillator during a fixed, specified period related to said intervals, to said factor, and to the amplitude-frequency difference sensitivity of said comparator means, thereby producing a representation of velocity.

7. In a digital DME system, a method of developing a representation of aircraft velocity comprising the steps of:

providing a pulse signal having a frequency dependent on a control voltage;

dividing said pulse signal by a predetermined frequency factor;

producing distance pulses respectively representative of passage of the aircraft through successive distance intervals of at most 0.2 miles each;

developing said control voltage in response to frequency disparity between the divided pulse signal and the distance pulses, said voltage varying in amplitude and sense in response to said disparity; and

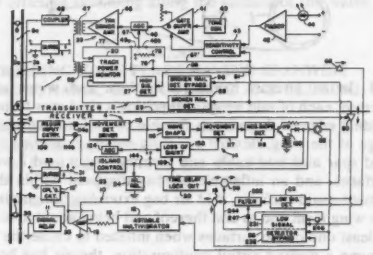
counting the number of pulses in said signal during a predetermined time interval related to said distance intervals and to the sensitivity of said control voltage relative to said frequency disparity, thereby producing a representation of velocity.

3,987,989

RAILWAY SIGNAL SYSTEM

Willard L. Geiger, Chagrin Falls, Ohio, assignor to Erico Rail Products Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 458,172, April 5, 1974, Pat. No. 3,929,307, which is a continuation-in-part of Ser. No. 348,944, April 9, 1973, Pat. No. 3,850,390. This application Apr. 16, 1975, Ser. No. 568,565
Int. Cl.[2] B61L *21/06*
U.S. Cl. 246—34 R 56 Claims



1. A railway signal system for monitoring a railroad track to produce a system output signal upon detecting a train on the monitored track, comprising: transmitter means for generating an electric signal; coupling means for coupling such electric signal to the track for transmission therein as a track signal; receiver means coupled to the track for receiving such track signal, said receiver means including detecting means responsive to a change in such track signal caused by such a train for detecting the same and thereupon to effect production of such system output signal, and power monitor means coupled to said transmitter means and responsive to the power level of such electric signal for producing a first power indicating signal when such power level is within a predetermined operational range and a second power indicating signal when such power level is outside such range, said power monitor means including latching means responsive to production of such second power indicating signal for latching up said power monitor means to continue producing such second power indicating signal.

3,987,990

AIR CUSHION WORKPIECE CARRIER

Keith E. Koch, Tremont; Robert W. Untz, Hanna City, and Donald G. Zook, Metamora, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

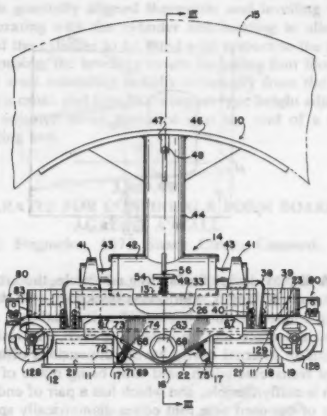
Filed Apr. 23, 1975, Ser. No. 570,916
Int. Cl.[2] B23D *21/14, 5/34*
U.S. Cl. 248—1 10 Claims

1. An air cushion workpiece carrier adapted to be transported on the forks of a lift truck and connectable to a source of pressurized air, comprising;

a base assembly supported on the forks of the lift truck and having an upper planar surface;

a workpiece support structure having a lower planar surface disposed above and parallel to said upper planar surface of the base assembly;

means forming a plurality of air pockets in one of the planar surfaces for receiving pressurized air from the source of pressurized air so that the support structure is supported by and floats on a cushion of air between the planar surfaces permitting substantially frictionless movement of the support structure relative to the base assembly for



precision positioning of the workpiece relative to the base assembly; and

retaining means operatively associated with the base assembly for retaining the workpiece support structure substantially above the base assembly while providing for limited unrestrained movement of the workpiece support structure in any direction.

3,987,991

PIPE RESTRAINTS FOR NUCLEAR POWER PLANTS

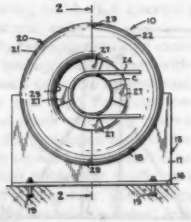
Robert E. Keever, Morgan Hill; Randolph Broman, Santa Clara, and Serge Shevekov, Sunnyvale, all of Calif., assignors to Nuclear Services Corporation, Campbell, Calif.

Filed Sept. 18, 1973, Ser. No. 398,488

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² F16L *3/12*

U.S. Cl. 248—49 **1 Claim**



1. A restraint for a pipe comprising:

a. a rigid arcuate restrainer overlying a pipe, said arcuate restrainer being in the form of a toroid with an inner wall and an outer wall, said inner wall thereof being arranged to surround the pipe;

b. means on said restrainer for controlling the displacement of the pipe;

c. a supporting member fixed to a supporting surface for supporting said restrainer; and

d. a plurality of additional toroidal restraints, each having outer and inner walls, each successive one of said additional restrainers being of progressively decreasing cross-sectional area, each progressively smaller restrainer being disposed concentrically within the preceding restrainer between the outer and inner walls thereof, and said plurality of additional toroidal restrainers being disposed concentrically within said arcuate restrainer between the inner wall and the outer wall thereof to stiffen said arcuate restrainer.

3,987,992

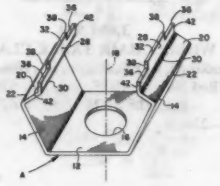
MOUNTING ARRANGEMENT FOR ELECTRICAL OUTLET BOXES

Ronald W. Foflygen, Leetsdale, Pa., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed June 20, 1975, Ser. No. 588,603

Int. Cl.² H02G *3/10, 3/08;* **F16B** *2/24*

U.S. Cl. 248—205 R **12 Claims**



1. A device for clamping an electrical outlet box or the like to a support, comprising; a generally U-shaped clip having a longitudinal axis, a generally flat base extending substantially perpendicular to said axis and having a substantially centrally located fastener receiving aperture therethrough, opposite legs diverging outwardly from said base at included angles with said base greater than 90° and substantially less than 180° and being yieldably deformable toward said axis, said legs having inwardly extending clamping portions adjacent the terminal end portions thereof, and spacer means extending outwardly from said clamping portions for spacing said clamping portions from a support when said legs are deformed toward said axis.

3,987,993

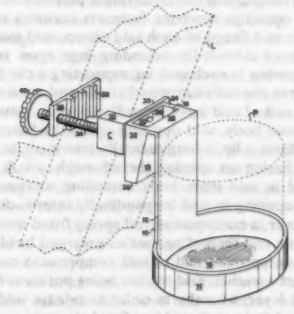
PAINT CAN SUPPORT AND BRUSH RECEPTACLE

Jeffrey E. Hopkins, 78 Fairfield Ave., Danville, Va. 24541

Filed Dec. 22, 1975, Ser. No. 643,502

Int. Cl.² E06C *7/14*

U.S. Cl. 248—210 **3 Claims**



1. Device for suspending a paint can and brush receptacle from the side rail of a ladder within easy access to a painter on the ladder comprising:

A. a clamping means for releasably mounting said device to said side rail;

B. can and brush support means including:

i. an upstanding support arm;

ii. a can receptacle extending outwardly from the lower end of said support arm;

iii. a brush receptacle extending between and connecting the upper end of said support arm and said clamping means and comprising:

a. front and rear walls joined at the bottom and spaced apart at the top;

b. a pair of end walls connecting the corresponding ends of said front and end walls;

c. said front wall joined to the upper end of said support arm; and

d. a pivotal connecting means joining said rear wall and said clamping means, whereby said can and brush support means is freely pivotal regardless of ladder inclination to maintain the paint can level to prevent spillage.

3,987,994

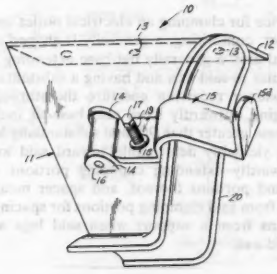
WHEELCHAIR TABLE CLAMP

Harold F. Frankford, 611 E. Rogers St., Houston, Tex. 77022

Filed Nov. 4, 1975, Ser. No. 628,834

Int. Cl.² A47C 7/50, 7/62

U.S. Cl. 248—226 R **1 Claim**



1. A pair of clamps, attachable to a wheel chair, said clamps being secured to a plywood panel forming a table top, each said clamp being comprised of a cast aluminum main body having a side flange, said flange having a plurality of equally spaced apart openings receiving fasteners securing said plywood panel to said flange of each said clamp, said main body having a pair of sidewardly extending lugs upon one side thereof, an opening in each said lug supporting a pin between said lugs, a lever pivotally supported at one end upon said pin, and opposite end of said lever extending past an arcuate side end of said main body, said opposite end of said lever being bent over to form a lip, a longitudinally intermediate portion of said lever having an opening therethrough, a bolt threadingly engaged in said main body extending sidewardly and through said opening in said longitudinally intermediate portion of said lever, a compression coil spring fitted around said bolt having one end thereof against an enlarged head formed on said bolt, an opposite end of said compression coil spring bearing against a washer, said washer being positioned against a side of said lever, whereby in order to release said clamps from said wheelchair, each said lip of said clamp levers is lifted upwardly against a tension of said compression coil spring, thus releasing said arcuate side end of said main body from said wheel chair.

3,987,995

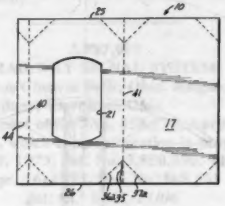
DISPLAY DEVICE

Leslie T. Hamasaki, 4958 Coringa Drive, Los Angeles, Calif. 90042

Filed July 15, 1974, Ser. No. 488,750

Int. Cl.² A47B 97/04

U.S. Cl. 248—450 **6 Claims**



1. A display device for holding an article, the article having dimensions of length, width, and thickness, said device comprising a flattened tube having a longitudinal axis, a wall with an inside surface and an outside surface, the inside surface forming an internal cavity having dimensions of axial length and of transverse width, said tube being made of a material which is stiffly flexible, and which has a pair of end edges and a pair of opposed side fold edges diametrically spaced apart from one another and extending from end edge to end edge, a pair of boundary fold edges which depart from one of said side fold edges so as to form an angle opening toward the respective end edge, and including a segment of one of said side fold edges, said boundary fold edges and segment forming a set which terminates at said end edge, the said segment moving angularly into said cavity when the wall is folded along said boundary fold edges, whereby the said folding forms a knee which at least partially occludes the cavity to form a restraint for supporting the article in the cavity, the wall having an aperture therethrough to give visual access to said article when resting upon the knee.

3,987,996

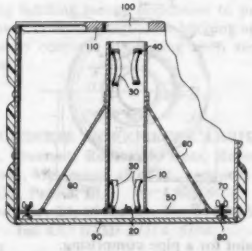
COMBINATION HASSOCK AND CHRISTMAS TREE HOLDER

Peter A. Yocca, Salisbury, Md., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Oct. 23, 1975, Ser. No. 625,313

Int. Cl.² A01K 97/10

U.S. Cl. 248—524 **1 Claim**



1. A combination hassock and Christmas tree holder, comprising:

a vertically elongated hollow cylinder for holding the trunk of a tree, the cylinder being open at the top and closed at the bottom;

eight like inwardly bowed, vertically elongated leaf type springs attached to the cylinder at their upper ends with

their lower ends being free to move, the springs being arranged in two rings of four;

a hollow cylindrical housing holding the cylinder completely inside its interior, the housing having an axis collinear with the axis of the cylinder having a closed bottom, and having a control hole above the cylinder that is larger in diameter than the diameter of the cylinder and that is generally aligned therewith; and levelling means cooperating with the cylinder and housing to allow the axis of the cylinder to be tilted with respect to the axis of the housing, the levelling means including four like elongated arms extending radially outwardly from the cylinder in a cross, and four like wingnut type height adjusters, each adjuster being threaded into the end of a corresponding arm.

3,987,997

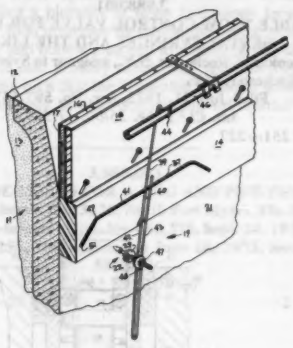
APPARATUS FOR CONFINING A FORM BOARD AGAINST A WALL

William J. Stegmeier, 1073 Shary Circle, Concord, Calif. 94520

Continuation-in-part of Ser. No. 438,018, Jan. 30, 1974, Pat. No. 3,904,717. This application Sept. 27, 1974, Ser. No. 507,248

Int. Cl.² E04G *17/14*

U.S. Cl. 249—207 **7 Claims**



1. A holder structure for use in confining a relatively wide board structure against a concrete wall comprising:

A. an anchor having an elongated shank equipped with

1. a laterally projecting barb for resisting extraction of said shank from concrete into which the portion of said shank having said barb is inserted prior to the setting of said concrete; and

2. a laterally projecting packing member spaced from said barb in trailing relation therewith relative to penetration of such concrete to abut said wall surface of said concrete and urge concrete toward said barb, said elongated shank extending rearwardly of said packing member for projection from said wall surface after said anchor is secured within said concrete;

B. an elongated holder for confining said board structure against said wall surface, said elongated holder having a longitudinally extending slot intermediate its ends through which said shank is fittable in sliding relation thereto whereby the location of said holder along said wall surface is adjustable, said holder being positioned with a first end portion at the location at which said board structure is to be confined and a second end portion on the opposite side of said anchor in bearing juxtaposition with said wall and being a spring component providing a spring force along its length effective to develop a bending moment on said holder adjacent the shank of said anchor to force the holder toward said board structure;

C. means securing said holder on said shank; and

D. said slot being provided by a pair of spaced apart, parallel spring rods which also define said spring component along the length of said holder.

3,987,998

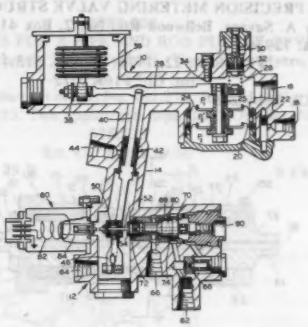
SERVO VALVE CONTROL SYSTEM

Roger C. Popp, Chesaning, Mich., assignor to Chandler Evans Inc., West Hartford, Conn.

Filed Aug. 3, 1972, Ser. No. 277,592

Int. Cl.² F16K *31/363*

U.S. Cl. 251—28 **7 Claims**



1. A fluidic control system comprising:

pressure sensing means;

means coupled to said pressure sensing means for providing a mechanical output signal commensurate with the state of said pressure sensing means;

power valve housing means defining a bore and inlet and discharge passages communicating therewith, said housing means also defining a vent passage communicating with said bore, said housing means inlet passage being adapted to be connected to a source of pressurized working fluid and said housing means discharge passage being adapted to be connected to a fluid consuming load, said housing means vent passage being adapted to be coupled to a region having a pressure less than the pressure of said working fluid;

a differential area power valve piston movable in said housing means bore, said piston cooperating with said bore and said inlet and discharge ports to define the operative state of said valve, said piston having first and second ends at at least a first shoulder, said first end and shoulder respectively defining first and second reaction surfaces, said first reaction surface having a greater area than said second reaction surface, said piston further having a vent passage therethrough between said first and second ends;

means establishing continuous fluid communication between said housing means inlet port and bore, said communication establishing means coupling the source of pressurized working fluid to said first and second reaction surfaces of said piston;

a floating servo valve member positioned in said housing means bore between said piston and housing means vent passage, said servo valve member cooperating with the second end of said piston to control flow through said piston vent passage to thereby control the pressure applied to said piston first end;

a movable output shaft for contacting said floating servo valve member and urging said servo valve member against said piston second end to define the closed position of the servo and power valves, movement of said servo operator shaft away from said floating valve member resulting in the servo valve opening under the influence of the pressure applied to the first end of said piston;

motion transmitting means for applying the mechanical output signal provided by said means coupled to said pressure sensing means to said movable output shaft, said motion transmitting means including sealing means for isolating the environment of said output shaft and servo valve member from the environment of said pressure sensing means; and

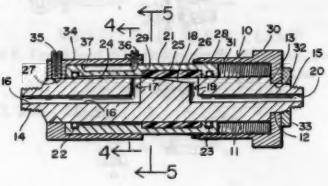
override means, said override means being selectively operable to operate said output shaft for causing the closing of the servo valve regardless of the instantaneous position of said motion transmitting means.

3,987,999

PRECISION METERING VALVE STRUCTURE

Harry A. Savage, Bellwood Rte. No. 2, Box 41, Greenwood, Ark. 72936

Filed Sept. 22, 1975, Ser. No. 615,418
Int. Cl.² F16K 5/12
U.S. Cl. 251—205 **5 Claims**



1. A metering valve device for dispensing minute quantities of a fluid from a high pressure to a low pressure environment comprising a core member having an inlet and an outlet, sleeve means mounted on said core member, said sleeve means having a first portion whose inside diameter is slightly greater than the outside diameter of said core forming a chamber about said core member, and sealing means mounted on said sleeve means at said first portion preventing the escape of fluid from said chamber, an opening formed at the surface of said core member within the confines of said chamber, first duct means connecting said opening and said inlet, said core member having a substantially V-shaped groove in spaced relation to said opening, said groove having a vertex and leg portions extending in a direction away from said opening, said vertex of said groove being on the surface of said core member and forming a fluid passageway whose cross sectional area increases in the direction away from said vertex, second duct means connecting said V-shaped groove and said outlet and means moving said sleeve means on said core member whereby any desired portion of said V-shaped groove may be positioned within the confines of said chamber for controlling the rate of flow of fluid from said inlet to said outlet.

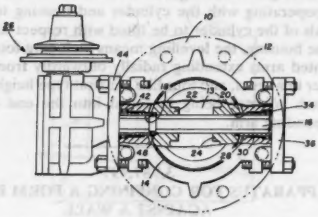
3,988,000

SEALS FOR A GAS SERVICE BUTTERFLY VALVE

Anthony L. Reese, Bradford, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Apr. 7, 1975, Ser. No. 565,512
Int. Cl.² F16K 31/44, 1/22
U.S. Cl. 251—214 **9 Claims**

1. In a butterfly valve including a body defining a fluid passage between an inlet and an outlet, a bore defined in said body extending from said passage to outward of said body, an operator at the outward end of said body bore, a rotatable vane in said passage, a rotatable operator shaft extending through said bore from a connection with said operator for supporting and operating said vane between open and closed positions of said passage, and a journal supporting said shaft for rotation in said bore, an annular groove formed in said shaft at a location axially intermediate said journal and said vane, annular seal means contained in said groove and an annular chamfer in the groove facing end of said journal for said seal means to be mechanically compressed in a wedged



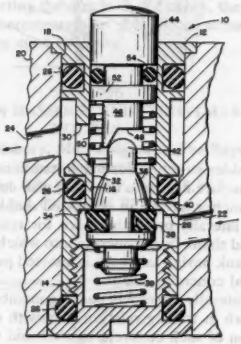
interfit between said journal and the vane surface thereat to prevent pressurized line content from escaping past said shaft and said journal to externally of said body.

3,988,001

VARIABLE FLOW CONTROL VALVE FOR USE WITH DENTAL SYRINGES AND THE LIKE

Rajko Kankaras, Rochester, N.Y., assignor to Sybron Corporation, Rochester, N.Y.

Filed July 21, 1975, Ser. No. 597,547
Int. Cl.² F16K 25/00, 31/524
U.S. Cl. 251—227 **11 Claims**



1. In a valve for dental syringes and the like including a valve housing having an inlet and an outlet for fluid and an intermediate valve seat, a valve member in the housing and bias means for urging and valve member against the valve seat to close the valve, the valve seat, valve member and bias means being axially aligned, the improvement comprising:

a. said valve member being both tiltable and axially movable with respect to said valve seat; and

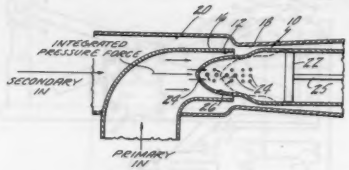
b. actuator means extending into said housing in axial alignment with said valve member, said means being movable axially and engagable with said valve member for first tilting said valve member with respect to said valve seat and thereafter moving said valve member axially from said valve seat against said bias.

3,988,002

IN-LINE BALANCE VALVES

Frank Kahoun, Warehouse Point, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed July 10, 1972, Ser. No. 270,385
Int. Cl.[2] F16K *39/00*
U.S. Cl. 251—282 1 Claim



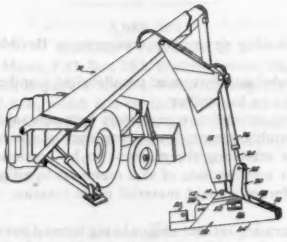
1. An ejector for inducing the flow through a duct, a primary duct having a primary nozzle terminating into said duct and having the axis of said primary nozzle in line with the flow in said duct, a hollow plug in said duct movable in relation to said primary nozzle and having at least a portion thereof extending a distance into said primary duct for varying the area of said primary nozzle, means for pressure balancing said plug over its entire operating range from full open to full closed including a plurality of holes judiciously located and sized to allow fluid upstream thereof in the primary duct to be admitted into said hollow plug and to discharge into said duct downstream of said primary nozzle, the size and location of said holes being such that the integrated pressure acting internally and externally of said hollow plug substantially equal zero.

3,988,003

PIPE GUIDE MEANS FOR A ROD AND PIPE PUSHER

William O. Schosek, Box 3626, North Fort Myers, Fla. 33903

Continuation-in-part of Ser. No. 482,275, Sept. 24, 1974, Pat. No. 3,907,253. This application June 26, 1975, Ser. No. 590,847
Int. Cl.[2] E21B *19/00*
U.S. Cl. 254—29 R 2 Claims



1. A pipe guide means for attachment to a pipe installing device of the type used to push a rod in coupled sections under a finished surface such as a driveway, street, etc., and to pull a pipe back through the hole formed by the rod, said device being reversably actuated by a conventional power means while positioned in an operating trench on one side of the finished surface with a target trench on the opposed side thereof, said guide means comprising:

A. a front guide assembly comprised of two spaced apart pairs of rollers, each pair comprising an upper and a lower roller, rotatably journalled in a first housing comprising a generally rectangular tube longitudinally fixed relative to the front end portion of the bottom wall of a main body portion of the pipe installing device, the upper and lower rollers of each pair being provided with cooperating annular grooves and being vertically spaced apart in a staggered relationship whereby a rod passing therebetween, is snugly engaged in said grooves while permitting one of the rod couplings to pass between the upper and lower rollers without being engaged by both rollers at the same time;

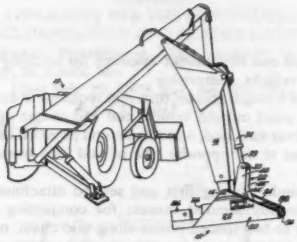
B. a rear guide assembly comprised of one pair of upper and lower rollers rotatably journalled in a second housing means, fixed relative to the rear end portion of the pipe installing device in alignment with said front guide assembly rollers, said one pair being configurated, and vertically spaced apart and staggered similar to one pair of said front guide rollers.

3,988,004

DRIVE JAWS FOR A PIPE AND ROD PUSHER DEVICE

William O. Schosek, P.O. Box 3626, North Fort Myers, Fla. 33903

Continuation-in-part of Ser. No. 482,275, June 24, 1974, Pat. No. 3,907,253. This application Sept. 22, 1975, Ser. No. 615,533
Int. Cl.[2] E21B *19/00*
U.S. Cl. 254—29 R 6 Claims



1. A reversable drive jaw means for use in combination with a pipe and rod pusher device of the type used to install a pipe under a finished driveway, street, etc., the drive jaw means being power actuated in a conventional manner by a bell crank lever pivoted relative to opposed, upstanding side walls of a generally channel shaped main body member of the device, the bell crank having a first lever arm pivotally attached to a piston rod which imparts reciprocating movement thereto, said drive jaw means comprising,

A. at least one drive jaw assembly mounted relative to a pair of upstanding, spaced apart side walls of a slide box, slidably engaged longitudinally of a base portion of the main body member, a second arm of the bell crank being pivotally linked to one of said slide box to impart forward and reverse reciprocating movement thereto, said drive jaw assembly comprising,

a. a generally rectangular, pivotal transverse jaw plate with a round central through hole somewhat enlarged relative to the diameter of a pipe or rod, normally passing longitudinally therethrough,

b. a pivot rod, fixed across the top edge of said jaw plate,

c. a pair of transversely aligned, upwardly opening notches in the upper edge portion of the respective slide box side walls to rotatably journal opposed extended ends of said pivotal rod,

d. a longitudinally extending keeper rod removably fixed relative to said slide box in a manner so as to engage said pivot rod to maintain said opposed ends in said notches,

e. a control lever rigidly fixed to one end of said pivot rod exteriorly of said slide box,

f. a tension spring having a first end anchored to said slide box and a second end, selectively adjustable between points of engagement with said control lever above and below the point of attachment to said pivot rod.

3,988,005
LOAD BINDER AND CHAIN ASSEMBLY

Gerald R. Mooney, 3080 Eldogor Lane, New Castle, Pa. 16105, and Louis A. Mooney, 1002 Ryan Ave., New Castle, Pa. 16101

Filed Sept. 18, 1975, Ser. No. 614,525
Int. Cl.² B66F 3/00
U.S. Cl. 254—78 **1 Claim**

1. A chain and load binder assembly for securing a load to a bed of a vehicle, comprising:

a chain of a length greater than that required to extend from a first point on said vehicle bed and at one side of said load, over said load, and to a second point on said vehicle bed and at the opposite side of said load from said first point;

a load binder having first and second attachment means permanently secured thereto for connecting said load binder to two spaced points along said chain, one of said attachment means comprising a member having a central opening through which the links of said chain pass freely and a slot communicating with and extending from said opening, said slot being of such dimensions as to receive an individual link of said chain and to prevent adjacent chain links from passing therethrough;

first securement means permanently connecting one end of said chain to said first point on said vehicle bed; and

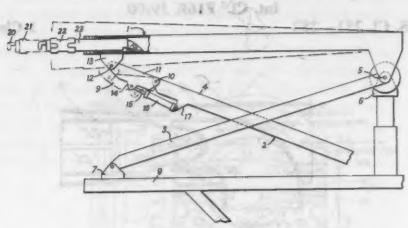
second securement means detachably connecting the other end of said chain to said second point on said vehicle bed, said second securement means including a member of greater width than said opening of said attachment means whereby said attachment means and said load binder are captively retained on said chain.

3,988,006
CARGO LOADING VEHICLES

Rodney Vernon Jones, Rochford, England, assignor to Atel Products Limited, Southend-on-Sea, England

Filed Apr. 15, 1975, Ser. No. 568,294
Claims priority, application United Kingdom, Apr. 18, 1974, 17132/74; Apr. 18, 1974, 17133/74
Int. Cl.² B66F 3/00
U.S. Cl. 254—124 **14 Claims**

1. A cargo loading vehicle, comprising a lifting platform, a scissor lift assembly for raising and lowering said platform, said scissor lift assembly comprising first and second pairs of scissor legs, said first pair of scissor legs comprising first and second scissor leg means effective for raising and lowering a first said of said platform, said second pair of scissor legs comprising third and fourth scissor leg means effective for raising and lowering a second side of said platform which second side is generally opposite to said first side, said first and second pairs of scissor legs being mounted for movement in unison and being so positioned as to have said first leg means generally corresponding to said third leg means, said first leg means comprising a first leg and further comprising first knuckle joint means, said third leg means comprising a third leg and further comprising second knuckle joint means, and

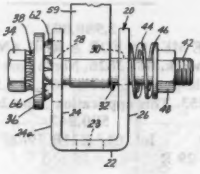


additional separate means enabling each of said knuckle joint means to move independently of the other of said knuckle joint means and without attendent movement of said second and fourth leg means.

3,988,007
TENSIONING APPARATUS

Kenneth J. Freiburger, Jr., R.R. No. 3 North,, Kendallville, Ind. 46755

Filed July 31, 1975, Ser. No. 600,822
Int. Cl.² A63B 61/04; B65D 63/00
U.S. Cl. 254—164 **16 Claims**



1. A tensioning device for tensioning a flexible element comprising:

a pair of substantially spaced parallel rigid members in fixed relation one to another;

an attacher extending transversely between said members and rotatably mounted relative to each of said members;

means for attaching the element to be tensioned to said attacher intermediate of said members to adjust the tensional forces in said material upon rotation of said attacher;

and cooperating ratchet means being formed between interfacing surfaces of said attacher and one of said members for providing one-way stepped rotation of said attacher relative said one member;

said ratchet means comprising a pluralilty of ratchet elements respectively formed on said attacher and on said one member and each element having a holding surface and a cam surface;

the cam surfaces on said attacher ratchet elements and said one member ratchet elements being engageable on rotation in one direction and the holding surfaces on said attacher elements and said one member elements being engageable to prevent rotation in the other direction; and

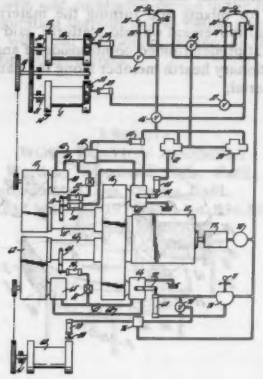
spring means for applying a spring force to said attacher relative said one member to resiliently urge said ratchet means on said attacher and said one member into holding engagement.

3,988,008

POWER LOWERING SYSTEM

James G. Morrow, Sr., and David J. Pech, both of Manitowoc, Wis., assignors to The Manitowoc Company, Inc., Manitowoc, Wis.

Filed Oct. 23, 1975, Ser. No. 625,109
Int. Cl.² B66D 1/50
U.S. Cl. 254—183 12 Claims



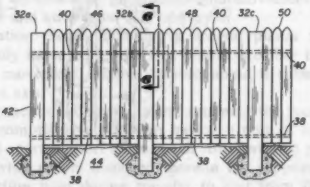
1. A power lowering system for a hoist drum of a load lifting device having an engine and a torque converter for rotating the drum in a load lifting direction comprising in combination, means for selectively controlling the torque delivered to the drum by the converter, a hydraulic motor connected to the drum, a variable displacement pump driven by the engine and having first and second supply-return lines connected to the motor, means for regulating the displacement of the pump to drive the motor in a load lowering direction and feedback means including an actuator interposed between the first supply-return line and the selective control means for delivering torque from the converter to the drum when the load being lowered causes the pressure in the first supply-return line to reach a predetermined level.

3,988,009

BOARD-TYPE FENCE

William C. Mann, P.O. Box 263, Broken Arrow, Okla. 74012

Continuation-in-part of Ser. No. 388,614, Aug. 15, 1973, Pat. No. 3,892,056, which is a continuation-in-part of Ser. No. 319,216, Dec. 29, 1972, Pat. No. 3,892,387. This application Mar. 10, 1975, Ser. No. 556,641
Int. Cl.² E04H 17/16
U.S. Cl. 256—24 4 Claims



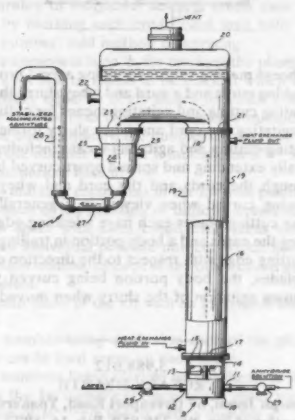
1. A board-type fence constructed without nails and bolts comprising a plurality of substantially identical fence panels connected between spaced fence posts, each fence panel being constructed from a plurality of substantially identically sized fence boards, each fence board being defined as having a pair of elongated flat surfaces which are parallel to each other and separated from each other in accordance with the thickness of the board, a pair of narrow elongated sides parallel to each other and separated from each other in accordance with the width of the boards, and a pair of ends separated from each other in accordance with the length of the board, each fence board being provided with a pair of parallel bores extending transversely across the width of the board and spaced apart a predetermined distance, each fence panel also including a pair of parallel rods spaced apart said predetermined distance and passing through the transversely extending bores of said plurality of fence boards when the latter are arranged in aligned side-to-side relation so that the rod ends project outwardly from the sides of each panel, each fence post being provided with a first pair of vertically spaced holes therethrough for receiving the rod ends of one end of a fence panel on one side of said fence post, each fence post also being provided with a second pair of vertically spaced holes therethrough for receiving the rod ends at the end of a second fence panel connected to an opposite side of said fence post from said first fence panel, said second pair of vertically spaced holes being horizontally offset and parallel to said first pair of vertically spaced holes.

3,988,010

APPARATUS FOR THE CONTINUOUS AGGLOMERATION OF AQUEOUS LATICES

Mark D. Paster, Worthington, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Feb. 20, 1975, Ser. No. 551,792
Int. Cl.² B01F 7/22
U.S. Cl. 259—8 28 Claims



1. An apparatus for continuously agglomerating particles in an aqueous latex comprising in combination:

A. a mixing zone, being a continuous stirred tank having a first feed port for an agglomerating solution stream, a second feed port for a latex stream, a mixing means located in said tank to mix said feed streams forming an admixture, a perforated member, forming at least a portion of a wall section of said tank, said member providing a flow-through port for said admixture inducing laminar-flow in said admixture,

B. an annular conduit to carry continuously said laminar-flowing admixture having a first orifice coinciding and interconnected with said perforated member and a second orifice in an opposite end of said conduit,

C. a low-shear zone being a continuous flow-through chamber having a first inlet port in one end of said chamber interconnected with said second orifice of said conduit to carry an agglomerated admixture, at least one additional

inlet port located in an opposite end of said chamber for feeding an emulsifying material to stabilize said agglomerated mixture and an outlet port in said opposite end,

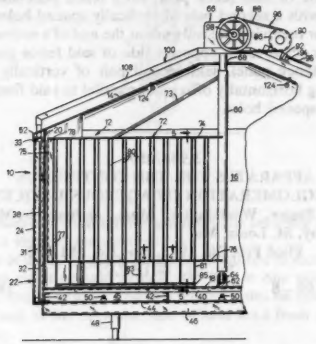
D. a continuous withdrawal means, interconnected with said outlet port of said chamber, for said stabilized agglomerated admixture.

3,988,011

FOOD PROCESSING APPARATUS

Wayne F. Kressin, Watertown, Wis., assignor to Kusel Equipment Company, Watertown, Wis.

Filed Sept. 18, 1975, Ser. No. 614,554
Int. Cl.² B01F 7/00; B29B 1/10; A01J 15/02
U.S. Cl. 259—104 **9 Claims**



1. A cheese making vat for receiving a food product and for use in making curds and a curd and whey slurry the vat including a rotating cutting and agitating means for cutting the curds and for agitating the curd and whey slurry formed in the vat, said rotating cutting and agitating means including a plurality of vertically extending and spaced apart curved blades moveable through the curds and the curd and whey slurry, said blades being curved when viewed in a generally horizontal plane, the cutting blades each have a leading edge sharpened for cutting the curds and a body portion in trailing relationship to the cutting edge with respect to the direction of movement of the blades, the body portion being curved whereby the blade causes agitation of the slurry when moved through the slurry.

3,988,012

ROTARY HEARTH

Emile Joseph Jemal, 67 Davenport Road, Yonkers, N.Y. 10710

Continuation of Ser. No. 226,819, Feb. 16, 1972, abandoned.
This application Mar. 5, 1974, Ser. No. 448,195
Int. Cl.³ F27B 21/00
U.S. Cl. 266—179 **1 Claim**

1. In a rotary hearth suitable for continuously treating metallurgical material, the improvement which comprises in combination;

a. a stationary circular hearth member having an outer wall, an inner wall and a roof, said walls and roof being heat-insulated and fixedly connected to one another;

b. supports for said stationary circular hearth member to hold it in an elevated position with respect to the ground;

c. a rotating platform positioned underneath said stationary hearth member and forming the flooring thereof, said platform being provided with guide rails and roller units on the underside thereof and with sealing means to prevent heat and gas losses;

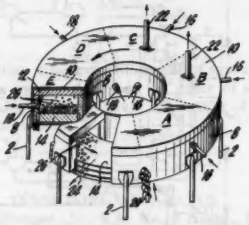
d. feeding means for the metallurgical material positioned in relationship with said stationary hearth member for continuously feeding the material thereto;

e. driving means cooperating with said guide rails and roller units for rotating said platform circularly around said hearth member;

f. a plurality of inlets positioned in relationship to said stationary hearth member to convey heat to the metallurgical material on said rotating platform;

g. a plurality of outlets positioned in relationship to said stationary hearth member to remove volatile matter from the metallurgical material;

h. means for mixing and turning the material during its rotational movement on said platform, said means being located at predetermined points inside of and attached to said stationary hearth member along the path of travel of the material;



i. a centrally located discharge outlet in said stationary hearth member for the discharging of the material therefrom;

j. a pair of radially and oppositely positioned plows for gradual advancement of the material from said outer wall to said discharge outlet;

k. a plurality of overlapping baffles vertically positioned between said inner and outer walls of said hearth for gradually moving the material through said outlet; and

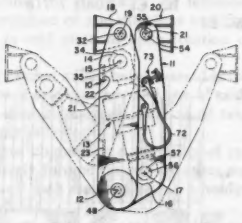
l. a heat-insulating circular baffle positioned inside said hearth member concentrically with respect to said outer wall and in the proximity of said discharge outlet, said baffle being vertically slidable through said roof.

3,988,013

SHOCK ABSORBER ASSEMBLY

Robert J. Von Bose, Arlington, Tex., assignor to Oil States Rubber Company, Arlington, Tex.

Filed Mar. 31, 1975, Ser. No. 563,825
Int. Cl.² F16F 9/00
U.S. Cl. 267—116 **11 Claims**



1. A shock-absorbing assembly comprising: first and second elongated arm means; means pivotably mounting first ends of said first and second arm means about a common arm pivot axis; first and second mounting means pivotably mounted to respective ones of said arm means at a point longitudinally displaced from said common arm pivot axis; hydraulic cushioning means; means pivotably connecting one end of said cushioning means to a first one of said arm means to define a

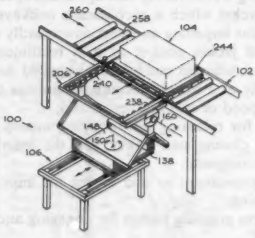
pivot axis therefor, substantially in line with and intermediate of the mounting means pivot axis on said first arm means and said common arm pivot axis; means pivotably connecting the other end of said cushioning means to the other one of said arm means to define a pivot axis therefor, in angularly offset relationship with respect to, and intermediate of, the mounting means pivot axis on said other arm means and said common arm pivot axis; said first and second arm means being pivotable about said common arm pivot axis to define a first acute angle with said cushioning device in the fully-extended length configuration thereof, and to define a second smaller acute angle with said cushioning means, in the fully-compressed configuration thereof.

3,988,014

WORK STATION ASSEMBLY

Charles P. Worden, Woodland Hills, Calif., assignor to Wangco Incorporated, Los Angeles, Calif.

Filed Mar. 10, 1975, Ser. No. 556,805
Int. Cl.² B23Q 1/04
U.S. Cl. 269—71 **20 Claims**



1. A work station assembly for use in a production system including a production line conveyor, the work station assembly being adapted for receiving a production item from the conveyor and retaining said item for translation relative to and rotation about first and second mutually perpendicular axes and comprising:

a base positionable near the conveyor;

translation means including a first planar member supported on said base for translational movement thereof toward and away from said conveyor;

first rotation means including a second planar member rotatably mounted to the first planar member for rotational movement relative thereto about a substantially vertical axis;

retaining means for engaging and retaining the production item, comprising a platform having a pair of opposed, spaced-apart support struts, each strut having a plurality of bearing rollers disposed thereon for supporting the production item during transfer to and from the conveyor, the axes of rotation of the bearing rollers being disposed perpendicular to the longitudinal axes of the support struts; and

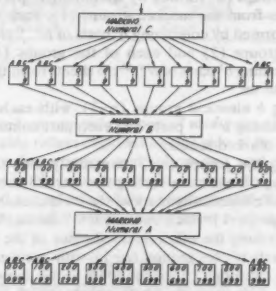
second rotation means including a support frame attached to the second planar member and means rotatably mounting said support struts to said frame for rotation about a substantially horizontal axis.

3,988,015

MARKING AND SORTING PROCEDURE

John R. Scantlin, Los Angeles, Calif., assignor to Transaction Technology, Inc., Los Angeles, Calif.

Continuation of Ser. No. 343,813, March 22, 1973, abandoned, which is a continuation-in-part of Ser. No. 223,272, Feb. 3, 1972, Pat. No. 3,802,101. This application Mar. 17, 1975, Ser. No. 558,912
Int. Cl.² B41F 13/54
U.S. Cl. 270—1 **16 Claims**



9. A method for marking a large number of plastic sheets to define a plurality of individual uniform credit card areas on each sheet by marking each credit card area with a unique credit card number, said method comprising:

selecting a numerical base, b, for marking the plastic sheets;

selecting a lot size of sheets to be marked which lot size is substantially equal to $b^n \cdot z/b$ sheets in which z is a whole number smaller than b and n is a whole number greater than one and is equal to the number of places required to express the number $b^{(n-1)}$ or a multiple of $b^{(n-1)}$ in terms of the numerical base b;

identically marking each sheet in the lot with position numbers in each of the plurality of uniform credit card areas on each sheet with each credit card areas on a sheet having an individual position number which differs from the position number of each of the other credit card areas on the sheet;

marking each sheet in the lot with an individual sheet number;

said sheet number being marked in each of the plurality of uniform credit card areas on each sheet;

said sheet numbers being marked on the sheets in the lot by marking the 1st numerical place of the sheet number on a first run of $b^{(n-1)} \cdot z/b$ sheets with a number c;

marking the 1st place of the sheet number on a second run of $b^{(n-1)} \cdot z/b$ sheets with a number d;

marking the 1st place of the sheet number on succeeding runs of $b^{(n-1)} \cdot z/b$ sheets with numbers e, f, g, etc., until the last run or b run of $b^{(n-1)} \cdot z/b$ sheets is marked in the 1st place of the sheet number with a number h with the range of the numbers c through h corresponding to the numerical range of the numbers 0 through $b-1$;

forming b groups (1) of sheets marked in the 1st place of the sheet number with each group (1) being identical by placing one part of $b^{(n-2)} \cdot z/b$ sheets marked with the number c in the 1st numerical place into each of the b groups (1); then placing one part of $b^{(n-2)} \cdot z/b$ sheets marked with d in the 1st numerical place in each of the groups (1), etc., until one part of $b^{(n-2)} \cdot z/b$ sheets marked with h in the 1st numerical place is placed in each of the b groups (1) such that each of the b groups (1) contains one part from each of the b runs and each groups (1) contains a total of $b^{(n-1)} \cdot z/b$ sheets;

marking the 2nd numerical place of the sheet number on the sheets in one of the groups (1) with the number c;

marking separately the objects in succeeding groups (1) in the 2nd place of the sheet number with the numbers *d, e, f, g*, etc., used in marking the 1st place of the sheet number with numbers until the last group (1) is marked in the 2nd place of the sheet number with the same number *h* used in marking the 1st numerical place of the sheet number;

forming *b* identical groups (2), *b* identical groups (3), *b* identical groups (4) and so on until *b* groups $(n-2)$ are formed by repeating the above procedures with each of the groups (2) formed by combining b^2 parts of $b^{(n-3)}z/b$ sheets from the marked groups (1), each of the groups (3) formed by combining b^3 parts of $b^{(n-4)}z/b$ sheets from the groups (2) and each of the groups (4) formed by combining b^4 parts of $b^{(n-5)}z/b$ sheets from the groups (3) and so on;

forming *b* identical groups $(n-2)$, with each group $(n-2)$ containing $b^{(n-2)}$ parts and each part containing *z* identically marked sheets;

marking the groups $(n-2)$ separately with the numbers *c* through *h* and then sorting the marked sheets by placing one of *z* identically marked sheets into each of *z* different groups $(n-1)$ which contain $b^{(n-1)}$ sheets, and

then marking the nth numerical place of the sheet number of each of the groups $(n-1)$ with succeeding numbers from *c* through *f* corresponding to the numerical range of 0 to *z* to provide $b^n z/b$ sheets which are separately marked with numbers corresponding to the numerical range from 0 to $b^n/z - 1$ by using a total of $b(n-1)+z$ marking steps,

whereby each of the plurality of credit card areas on each sheet bears a unique number composed of the position number of the credit card area on the sheet and the sheet number of the particular sheet on which the particular credit card areas are defined and the number of sheets which are sorted into each of the *b* groups after each marking, except for the last marking, is decreased by a factor of $1/b$ from the number of sheets sorted into each of the *b* groups after the preceding marking operation.

3,988,016

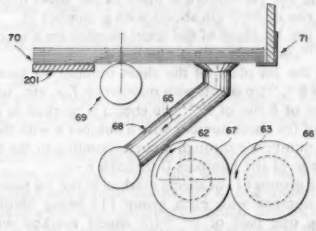
HIGH SPEED IN-LINE PAPER INSERTING APPARATUS AND METHOD

George Merker, Fair Lawn, N.J.; Joseph Krupp, Bangor, Pa.; Menashe Navi, Lebanon, N.J., and Thomas A. Ward, Whitehall, Pa., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Nov. 1, 1974, Ser. No. 520,179

Int. Cl.² B65H *5/30*

U.S. Cl. 270—55 **12 Claims**



6. In an apparatus for high speed in-line inserting a supplement insert into a newspaper comprising, in sequence:

A. a newspaper folding mechanism including means to provide a folded newspaper having an extending lap on the top half with respect to the bottom half and to convey said folded newspaper as folded jacket with the folded edge forwardly disposed to a speed-up mechanism,

B. said speed-up mechanism including means to accelerate said conveyed jacket forwardly and downwardly onto a rectilinearly moving conveyor,

C. said rectilinearly moving conveyor comprising an endless conveyor, a plurality of folded newspaper jacket receiving means operatively connected to said conveyor in linearly spaced successive positions thereon, wherein each of said jacket receiving means comprises:

i. an angularly movable lower arm adapted to support and rectilinearly carry said jacket with its folded edge maintained forwardly and downwardly with respect to said extending lap, and

ii. a fixed upper arm angularly disposed from said movable arm, said fixed upper arm together with said movable lower arm positioned to define a rearwardly and upwardly openable pocket which is rectilinearly conveyed upon said conveyor, and

iii. newspaper top half edge gripping means mounted upon the distal end of said fixed upper arm to selectively maintain only said top half of the newspaper jacket against said fixed upper arm, and

iv. means disposed along the rectilinear path of travel of said each newspaper jacket receiving means to coact with said movable lower arm to selectively pivot the newspaper jacket thereon supported forwardly into contact with said fixed upper arm whereby said gripping means are operable to selectively grip said extending lap while allowing said bottom half to be selectively rearwardly pivoted by said lower movable arm, thereby defining a rearwardly and upwardly opening pocket in said jacket which is rectilinearly conveyed, and;

D. means for impelling an insert downwardly and forwardly into said jacket pocket as it is rectilinearly conveyed therepast, wherein said insert is impelled downwardly and forwardly at a speed substantially greater than the rectilinear speed of said conveyor, and;

E. means for releasing said gripping means from said lap thereby closing said jacket with the insert therein as a folded composite;

F. the improvement to said means for impelling an insert comprising:

i. vacuum gripping means for engaging and gripping said insert;

ii. cam means for substantially simultaneously lowering said vacuum gripping means and attached insert, and pivotably raising an upper nipping roller into contact with said insert;

iii. means for substantially simultaneously releasing said vacuum gripping means from the insert while passing said insert between said raised upper nipping roller and a stationary lower nipping roller, whereupon said cam means further includes means for raising said vacuum gripping member to its starting position, against the next insert, while simultaneously lowering said upper nipping roller to a horizontal position adjacent said lower nipping roller.

3,988,017

WORKPIECE FEEDING DEVICE

Henry C. Kyhl, Leonia, N.J., assignor to Lockheed Electronics Co., Inc., Plainfield, N.J.

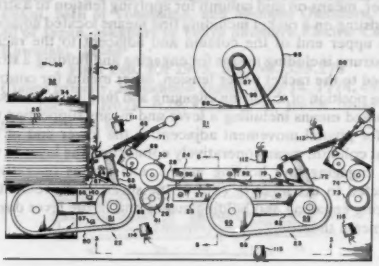
Filed Mar. 20, 1975, Ser. No. 560,381

Int. Cl.² B65H *7/14, 3/04*

U.S. Cl. 271—111 **16 Claims**

1. A device for removing workpieces from a stack of workpieces for individual processing comprising, a plurality of feeders collectively from said stack of workpieces, at least one but not all of said plurality of feeders being arranged to engage said stack and remove workpieces therefrom on command, drive means for actuating said feeders to separate said workpieces as they are moved along said path, and sensor means to interdependently control the operation of said feeders, said sensor means including first detector means for sensing the

presence of a workpiece at one feeder to inhibit actuation of a second feeder, and second detector means for sensing the



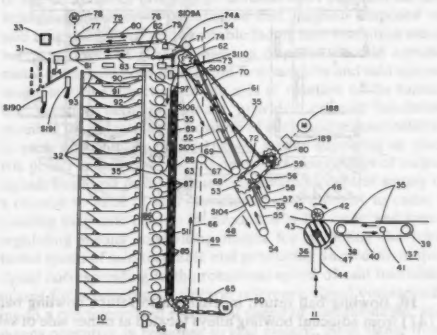
absence of a workpiece between feeders to override said first detector means and command actuation of said second feeder.

3,988,018

PAPER SORTER

Robert Joseph Tusso, Randolph; Daniel Richard Erny, Boonton, and James Edward Landrith, Andover, all of N.J., assignors to Van Dyke Research Corporation, Whippany, N.J.

Filed Feb. 25, 1975, Ser. No. 552,964
Int. Cl.² B65H *29/60, 31/24*
U.S. Cl. 271—173 **50 Claims**



8. An array of stationary, vertically stacked paper receiving bins for a paper sorter, each bin having a generally concave shape with two upwardly sloping side portions separated by a center portion, one of said side portions being deflectable, a resilient element for biasing said deflectable side portion in said upwardly sloping direction, an entrance guide lip at the edge of the other of said side portions for guiding sheets entering said bin toward the top thereof, and at least two transverse ridges extending from the bottom surface of said bin.

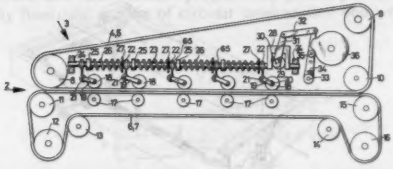
3,988,019

APPARATUS FOR DEPOSITING FLAT ARTICLES FED BETWEEN BELTS

Fritz Achelpohl, Lengerich, Westphalia, Germany, assignor to Windmoller & Holscher, Lengerich, Westphalia, Germany

Filed Apr. 29, 1975, Ser. No. 572,739
Claims priority, application Germany, May 8, 1974, 2422290
Int. Cl.² B65H *29/46*
U.S. Cl. 271—180 **9 Claims**

1. Apparatus for depositing flat articles that are fed between a pair of double belt conveyors comprising, a pair of laterally spaced upper conveyor belts and a pair of laterally spaced lower conveyor belts, the upper run of each lower belt confronting the lower run of each respective upper belt, said articles engaged between said upper and lower belts near respective margins thereof, a cam-operated thrust ejector disposed between the laterally spaced conveyor belts and adapted to move through the conveying plane of the belts,



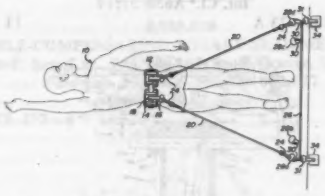
rollers disposed on one side of one of said pairs of conveyor belts, retractable rollers disposed on one side of the other pair of conveyor belts, wherein said rollers and said retractable rollers compress the conveyor belts, and control means for retracting said retractable rollers away from said other pair of conveyor belts and for actuating the thrust ejector.

3,988,020

SWIMMING EXERCISE AND TRAINING APPARATUS

James R. Carter, 1601 Lyle Drive, San Jose, Calif. 95129

Filed Sept. 8, 1975, Ser. No. 611,144
Int. Cl.² A63B *69/12*
U.S. Cl. 272—125 **3 Claims**



1. An exercise apparatus for use in a swimming tank comprising

a. a belt disposed about the waist of a swimmer;

b. at least two rings coupled to said belt;

c. a means coupled to said belt having at least two straps attached thereto for securing said means to said belt disposed about the waist of the swimmer for securing the position of said rings and for securing the position of said belt about the waist of the swimmer;

d. at least two lines, each of which includes attaching means at the first and second ends thereof, the first ends of said lines being coupled to said rings on said belt; and

e. a means for attaching the second ends of said lines to an edge of a swimming tank.

3,988,021

GAME TABLE

Douglas B. Grover, 201 S. Greenfield, Space 79, Mesa, Ariz. 85206

Filed Oct. 30, 1975, Ser. No. 627,249
Int. Cl.² A63D *15/00*
U.S. Cl. 273—3 C **7 Claims**

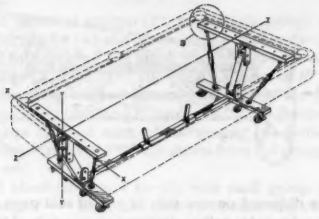
1. A game table comprising:

a. a substantially planar top having longitudinally opposed ends and a transversely spaced apart sides;

b. a support structure, said structure including first and second leg assemblies disposed adjacent opposite ends of the table, each of said leg assemblies including:

i. a first member pivotally secured to the underside of said top along a longitudinally extending pivot axis, whereby said table can be selectively pivoted between a substantially vertical and a substantially horizontal position;

ii. a second member pivotally secured to said first member along a generally transverse pivot axis;



iii. pedestal means pivotally secured to said second member along a generally transverse pivot axis; and

c. adjusting means for selectively moving said pedestal means longitudinally bidirectionally thereby selectively raising and lowering said table top.

3,988,022

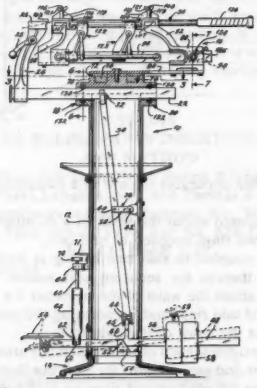
RACKET STRINGING MACHINE

Thurman P. Halbrook, St. Louis County, Mo., assignor to Tennis Machines, Inc., St. Louis, Mo.

Filed June 4, 1975, Ser. No. 583,647

Int. Cl.² A63B 51/14

U.S. Cl. 273—73 A **11 Claims**



1. A machine for use in stringing rackets including an upright column having a pedestal portion attached to the lower end thereof for supporting the column in an upright position, means attached to the upper end of the column for supporting a racket during the stringing thereof, said racket supporting means including a first member fixedly attached to the upper end of the column, a second member mounted for rotation adjacent to the first member, an annular groove formed in one of said members and an annular ridge formed on the other member and positioned extending into the annular groove, said ridge having an outer surface defined by a plurality of spaced teeth, means in said one member positioned adjacent to said annular groove including a pawl and means for moving the pawl radially relative to the annular groove and relative to the annular ridge from a position engaged with a selected one of the teeth in the annular ridge to prevent relative movement between the first and second members and a position spaced from the annular ridge whereby the second member and a racket supported thereon can be rotated relative to the first member, means on said column for applying tension to a string being strung on a racket including first means located adjacent to the upper end of the column and adjacent to the racket being strung including means for engaging and holding a string attached to the racket under tension, other means for controlling the position of the string engaging and holding means, said last named means including a lever and means supporting the lever for pivotal movement adjacent to the lower end of the upright column, means operatively connecting the layer to the string engaging and holding means, and means operatively connected to the lever to control the speed of movement of the string engaging and holding means and of the lever during movements thereof.

3,988,023

BOWLING BALL RETURN MECHANISM

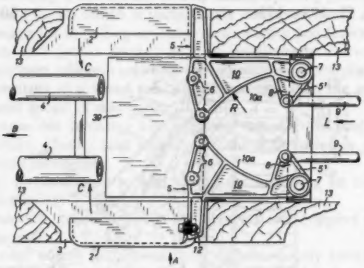
August Schmid, Schwerzenbach, Switzerland, assignor to Patentverwertungs-und Finanzierungsgesellschaft SERANIA AG, Glarus, Switzerland

Filed June 23, 1975, Ser. No. 589,265

Claims priority, application Switzerland, June 27, 1974, 8826/74

Int. Cl.² A63D 5/02

U.S. Cl. 273—49 **13 Claims**



10. Bowling ball return mechanism to return bowling balls (41) from adjacent bowling alleys located at either side of said mechanism, said adjacently located alleys having openings (3) to admit bowling balls (41) to the mechanism, wherein said mechanism comprises

respective oppositely located doors (2) blocking access through the openings (3);

mutually interlocking means (5, 6, 10) connected to each said doors and movable therewith upon opening movement of either door, movement of either door (2) and with it the associated interlocking means effecting placement of the respective interlocking means into interfering position with the interlocking means of the other door to block opening of the other door when one of said doors has opened;

a rocker mechanism (28) comprising a ball receiving surface (4) and an essentially horizontally extending rocking shaft 29 forming a fulcrum for said ball receiving surface, located between said doors (2) beneath the opening thereof to receive a bowling ball (41) thereon admitted through a respective door, the ball receiving surface (4) deflecting under the weight of the ball;

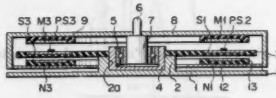
and connection link means (30, 31, 35, 36, 9) directly mechanically connecting said rocker mechanism (28) and said doors (2) to move the doors to closing position upon rocking of said rocker mechanism due to placement of the weight of a bowling ball (41) thereon.

3,988,024

TURNTABLE APPARATUS

Terumoto Watanabe, Kanagawa; Masato Nagata; Shigeo Fukui, both of Yokohama, and Manabu Okamura, Tokyo, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Feb. 26, 1975, Ser. No. 553,276
Claims priority, application Japan, June 14, 1974, 49-67029
Int. Cl.² H02K *1/22;* **G11B** *3/60;* **H01R** *39/06*
U.S. Cl. 274—1 E **12 Claims**



1. A turntable apparatus comprising a stationary substantially planar substrate having a shaft; a turntable rotatably supported by said shaft on said stationary substrate and superposed over said stationary substrate, said turntable and said substrate lying in registry one with the other and in spaced parallel planes normal to the axis of rotation of the turntable, said turntable having an outer peripheral edge and an annular inner surface, an annular metal plate secured to and dependent from said turntable adjacent said outer peripheral edge; a doughnut-shaped insulation member fixedly supported on said stationary substrate to overlie said stationary substrate in spaced relation thereto in the direction of the axis of rotation of the turntable; a plurality of coreless coils disposed on said insulation member; a plurality of first magnets disposed on said inner surface of said turntable facing said insulation member; a plurality of second magnets disposed on said annular metal plate, said coils facing said first magnets and said second magnets in the direction of the axis of rotation of the turntable; position detecting means provided on said insulation member for detecting the position of each said magnet relative to each said coil; an electric power source supplying an electric power to said coils; means operable upon receipt of output signals from said position detecting means to control supply of a current to each of said plurality of coils thereby to cause a rotating magnetic field to be produced in the coils; and speed regulating means comprising means for detecting the rotational speed of said turntable and producing an electric output signal corresponding to the rotational speed of said turntable, means for producing an electric reference signal corresponding to a predetermined rotational speed of said turntable, and means operative in response to said electric input signal from the rotational speed detecting means and said electric reference signal from the electric reference signal producing means thereby to control the amount of a current supplied to each coil from said power source.

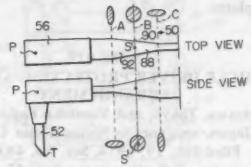
3,988,025

RECORD DISC CUTTING APPARATUS

Fumitaka Nagamura, 1-6-14, Tomigaya, Shibuya, Tokyo, Japan

Filed Feb. 13, 1975, Ser. No. 549,502
Int. Cl.² G11B *3/44*
U.S. Cl. 274—37 **1 Claim**

1. A record disc cutting apparatus comprising: a cutter head having a cutting stylus tip for forming a sound groove on a rotating record disc, a 45—45 drive mechanism, and means drivingly and mechanically coupling said drive mechanism to said cutter head, said drive mechanism comprising left and right drive portions adapted to drive said cutting head from the respective directions of 45° with respect to the driving vertical axis defined by the inoperative axis of said cutting stylus tip, and means responsive to any driving direction for said cutter head for providing an angularly varying deflection of said pointed end with respect to a plane perpendicular to the advancing direction on the record disc of said cutting stylus tip and including said driving vertical axis, which angularly varying deflection varies with the relative amounts of the motion imparted to said left and right drive portions, said means comprising a flexible support arm for supporting said cutter head in cantilever fashion, said support arm comprising a section of circular cross-section from the opposite sides of which extend portions of elliptical cross-section whose major to minor axis ratio becomes progressively greater proceeding away from said section of circular cross-section and whose



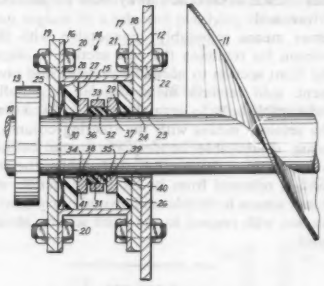
major axes are substantially in right-angled relationship with respect to each other, one of said major axes being the same in direction as said cutting vertical axis, said support arm portions forming a line along which said fulcrum is positioned and, as the driving direction changes from said 45° directions toward the vertical driving direction, the fulcrum position linearly shifts from said circular section toward the end of one of said elliptical portions and as the driving direction changes from said 45° directions toward the horizontal driving direction, the fulcrum position linearly shifts from said circular section toward the end of the other elliptical portion.

3,988,026

SELF-COMPENSATING ROTARY SEAL MEMBER

Dennis E. Kemp, Jr., P.O. Box 167, South Orange, N.J. 07079

Filed Feb. 27, 1976, Ser. No. 662,277
Int. Cl.² F16J *15/34*
U.S. Cl. 277—4 **9 Claims**



1. A low pressure, self-compensating rotary seal member mountable over a drive shaft comprising, in combination, a housing including first and second parallel end plates, a shaft clearance aperture formed in each said end plate, said apertures being disposed in coaxial alignment, first and second wear plates within said housing adjacent said first and second end plates, respectively, said wear plates being formed of polymeric material of a low coefficient of friction, the faces of said wear plates remote from said end plates being planar and disposed normal to the axis of said apertures, said wear plates including shaft clearance apertures in alignment with the clearance apertures of said end plates, a deformable, elastic, radially and axially expansible tubular drive collar mountable over said shaft, said collar being formed of elastomeric material having a high coefficient of friction, the inner diameter of

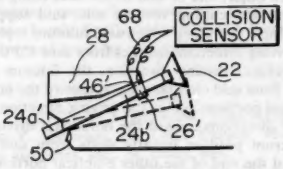
said tubular collar being less than the diameter of said clearance apertures and being sized frictionally to engage and rotate with said shaft, and first and second free floating metal thrust washers disposed between the opposite ends of said collar and said parallel faces of said first and second wear plates, respectively, said washers including internal clearance apertures larger than the outside diameter of said shaft, and being in frictional contact with said ends of said collar and said wear plates, the frictional drag between said collar and washers being greater than that between said washers and wear plates whereby, on rotation of said shaft, said washers are rotated relative to and yieldingly biased against said faces of said wear plates.

3,988,027

VEHICLE DRIVER PROTECTING STEERING ARRANGEMENT

Yoshio Serizawa, Tokyo, and Yasuhiko Fujiwara, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Feb. 19, 1974, Ser. No. 443,187
Claims priority, application Japan, Feb. 22, 1973, 48-21638
Int. Cl.² B62D *1/18*
U.S. Cl. 280—87 C **3 Claims**



1. A steering device for a vehicle which has collision sensor means for producing a collision representing signal, the device comprising;

a steering column having a front lower column section and a rear upper column section and a pivot joint connecting adjacent ends of the front section and the rear section for free gravitational downward, pivotal movement of the rear section in direction away from the head of a vehicle driver; and

retainer means releasably connectable with the steering column for retaining the rear section in alignment with the front section to normally prevent said pivotal movement, said retainer means having a plurality of self-destroyable bolts to normally provide fixed connection of the retainer means with the steering column, said bolts being destroyable in response to a collision signal, whereby upon destruction of the bolts, the steering column is released from its fixed connection with the retainer means to enable said pivotal movement of the rear section with respect to the front section about the pivot joint.

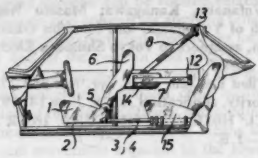
3,988,028

SAFETY SYSTEM FOR THE OCCUPANTS OF VEHICLES ESPECIALLY MOTOR VEHICLES

Roland Satzinger, Hammelburger Str. 21a, D-8731 Euerdorf, Germany

Filed Apr. 14, 1975, Ser. No. 567,895
Claims priority, application Germany, Apr. 22, 1974, 2419368
Int. Cl.² B60R *21/10*
U.S. Cl. 280—748 **16 Claims**

1. In a safety system for the occupants of a vehicle having a front seat, said front seat having a back rest, the improvement which comprises an energy-absorbing holding means for said back rest comprising a first belt or cable attached at one end to a rearward portion of the body of said vehicle and at the other end being wound about and attached to a winder disposed on the rear side of the back rest of the front seat and a second belt or cable attached to said vehicle body rearwardly of said winder and wound about and connected to said winder.



3,988,029

CRYOGENIC FLUID COUPLING DEVICE

Clarence John Gibson, El Cajon, Calif., assignor to Kaiser Aerospace and Electronics Corporation, Oakland, Calif.

Filed Aug. 28, 1974, Ser. No. 501,268
Int. Cl.² F16L *11/12, 55/00, 59/16*
U.S. Cl. 285—47 **6 Claims**

1. A device for passage of cryogenic liquid therethrough to a vessel, comprising a coupling formed of a female portion and a male portion, said female portion comprising an inner tube having a liquid inlet port for transferring liquid cryogen, a middle tube having a vapor outlet port for transferring vapor, and an outer vacuum jacket, said male portion comprising an inner tube having a liquid outlet port for transferring liquid cryogen, a middle tube having a vapor inlet port for transferring vapor, and an outer vacuum jacket, releasable means joining said male and female portions establishing a vapor seal and a liquid seal between the corresponding middle and inner tubes of said male and female portions, said means, upon release, releasing the liquid seal of said inner tube prior to releasing the vapor seal of said middle tube whereby vapor derived from the release of the liquid seal of the inner tube is collected in the middle tube, and double concentric vacuum jackets which extend over the length of the junction of said male and female portions.

3,988,030

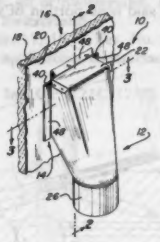
SLIP-JOINT COUPLING, METHOD OF INSTALLING SAME AND FRAME SUBASSEMBLY FOR USE THEREWITH

Jack L. Twedell, 6749 S. Delaware, Littleton, Colo. 80120

Filed May 12, 1975, Ser. No. 576,565
Int. Cl.² F16L *41/00, 43/00*
U.S. Cl. 285—183 **7 Claims**

1. In combination: a hollow sheet metal fitting terminating at one end in a rectangular opening bordered on both sides by outturned flanges, on one end by an outturned flange and on the other end by an inturned flange; and a generally U-shaped three-sided frame including a crosspiece and a pair of sideframe elements each of which is formed to provide an outwardly-facing channel and an inwardly-facing channel, said outwardly-facing channels being sized and located to cooperate with one another to receive the edges of a duct board panel bordering three sides of a rectangular opening therein matching the rectangular opening in the fitting, said inwardly-facing channels being sized and located to slidably receive the correspondingly positioned outturned flanges of the fitting upon movement of said outturned end flange of said fitting in the direction of the crosspiece of the frame with the sideframe

elements in parallel relation, and said inturned end flange defining a lock effective to retain said fitting within the duct



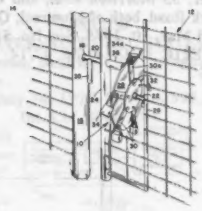
board panel opening when bent down along the unframed edge thereof.

3,988,031

MULTIPLE PADLOCK DEVICE

Gordon R. Meyer, Rte. 1, Box 7, Cotulla, Tex. 78014

Filed Mar. 22, 1976, Ser. No. 668,712
Int. Cl.² E05C 1/04
U.S. Cl. 292—153 10 Claims



1. A multiple padlock device which allows entrance through a gate of a fence by removing any one of a number of padlocks, said device comprising:

stationary axis mounted on said gate in a substantially horizontal position;

plate means substantially perpendicular to and rotatable on said stationary axis, said plate means having a fixed number of unlocking holes a given distance from said stationary axis;

covering means pivotally mounted on said plate means for pivotally covering said fixed number of unlocking holes, padlocks at least equalling said fixed number of unlocking holes, said padlocks being connectable through openings in said plate means and said covering means to hold said covering means over said fixed number of unlocking holes;

locking bar slidable through a member of said gate with a first end engaging a member of said fence, a second end of said locking bar abutting said plate means said given distance from said stationary axis;

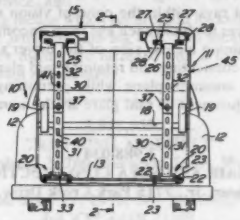
removal of one of said padlocks allowing said covering means to be pivoted so that said locking bar may slide through one of said unlocking holes which was uncovered by said covering means to disengage said fence member.

3,988,032

MOTOR VEHICLE TRUNK ACCESSORY

Howard M. Weinstein, 340 W. 5th St., Ship Bottom, N.J. 08008

Filed Feb. 28, 1975, Ser. No. 553,917
Int. Cl.² B62D 25/12; B60R 11/00
U.S. Cl. 296—76 2 Claims



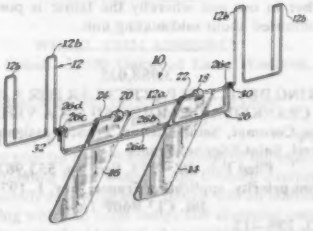
1. For use in conjunction with an automobile trunk including an upwardly opening luggage chamber, and a swingable closure hingedly connected to said chamber to close said opening, the combination comprising: at least one chamber anchor for securement in the chamber remote from the hinged connection of said closure, at least one closure anchor for securement to the closure remote from said hinged connection, selectively extensible and contractile strap means connected between said anchors, and releasable fastener means detachably securing said strap means in a selected position of extensile and contractile movement, for releasably restraining said closure against opening beyond a selected open position, said strap means comprising a pair of overlying strap regions, at least one of said regions having one longitudinally arranged row of through holes, said holes being elongate longitudinally of said one strap region, and said fastener means comprising a headed element extending transversely of and fixedly connected to the other of said strap regions, said headed element being rotatable relative to said one strap region and removably engageable through a selected one of said holes, for maintaining said strap regions in a selected overlying relation.

3,988,033

GLARE SHIELD

Fred P. Vacha, 226 Lombardy Ave., Fort Lauderdale, Fla. 33308

Filed Sept. 8, 1975, Ser. No. 610,983
Int. Cl.² B60J 3/02
U.S. Cl. 296—97 C 3 Claims



1. A glare shield device adapted for attaching to an automobile sun visor providing a separate shield aligned with each of a driver's eyes so that the left side of the road is shielded from glare and the driver's lane remains unshielded for a clear view comprising:

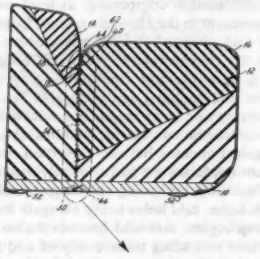
an elongated single member frame;
means at the opposed terminal end portions of said frame for attaching the frame to an automobile sun visor;
a pair of laterally adjustable elongated parallely disposed glare shield members hinged at one end thereof intermediate the end portions of said frame and extending obliquely downwardly therefrom so as to be substantially coincident with the line of travel of oncoming headlights, said members having a width adapted to intercept only those light rays within the cone of vision of each of the driver's eyes to shield each eye from oncoming headlights while retaining a clear view of the driver's lane; and
a means for connecting and retaining said glare shield members in a common plane while permitting independent lateral adjustment of said glare shield members.

3,988,034

CHAIR AND SOFA CONSTRUCTION

Lee Harold Fister, Jr., 7715 Park Creek Drive, Dayton, Ohio 45459

Filed July 3, 1975, Ser. No. 593,172
Int. Cl.² A47C *1/02*
U.S. Cl. 297—455 **10 Claims**



1. An improved foam seating unit comprising
a plurality of foam pieces attached together to form seat and back portions, said seat portion having a transverse slot therein at its juncture with said back portion,
a base attached to said seat portion,
upholstery covering said seat and back portions,
said upholstery covering having an inside transverse pocket, said transverse pocket lying in said transverse slot in said seat portion,
a rigid rod in said transverse slot,
rod securing means attached to said rod and extending through said seat portion, said rod securing means being pulled downwardly and secured to said base whereby the back and seat portions are stabilized relative to one another in use and whereby the fabric is positioned and contoured about said seating unit.

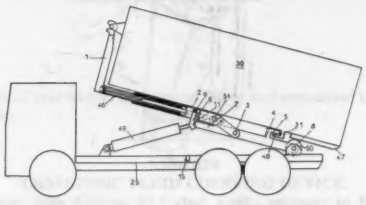
3,988,035

LOCKING DEVICE, IN PARTICULAR FOR A HANDLING CRANKED ARM MOUNTED ON A VEHICLE

Antoine Corompt, Saint-Etienne, France, assignor to Bennes Marrel, Saint-Etienne, France

Filed Feb. 28, 1975, Ser. No. 553,983
Claims priority, application France, Mar. 1, 1974, 74.07879
Int. Cl.² B60P *1/64*
U.S. Cl. 298—12 **9 Claims**

1. A safety locking device for a handling system, the device comprising, in combination:
a rear part of a vehicle chassis, an intermediate subchassis having a nose portion, said intermediate chassis being pivotably mounted on said rear part and restable on said vehicle chassis; a sleeve, said sleeve being pivotally mounted on said intermediate chassis; a cranked arm having a foot, said foot being slidably mounted within said sleeve; at least one hook having a free end, nose and catch, said hook being pivotally mounted on said sleeve about an axis transverse to its longitudinal axis, said nose of said hook in its rearward pivoted position being positioned beneath said nose portion of said subchassis with



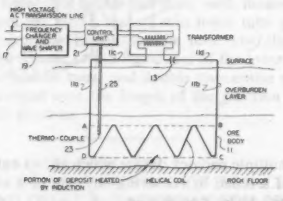
said foot of said crank arm lying in prolongation of said subchassis; and hook-contacting means carried by said vehicle chassis, said nose of said hook being slidably positionable against said hook-contacting means to effect automatically release of said hook from said nose portion of said subchassis upon engagement of said subchassis with said vehicle chassis.

3,988,036

ELECTRIC INDUCTION HEATING OF UNDERGROUND ORE DEPOSITS

Sidney T. Fisher, 53 Morrison Ave., and Charles B. Fisher, 2850 Hill Park Road, both of Montreal, Quebec, Canada

Filed Mar. 10, 1975, Ser. No. 556,775
Int. Cl.² E21C *37/18, 41/06, 41/14*; H05B *5/08*
U.S. Cl. 299—5 **8 Claims**



1. A method of extracting metal from an underground ore body, comprising the electric induction heating in situ of a selected portion of the ore body by means of alternating current of selected voltage, current, waveform and frequency, passed through a conductive path substantially encompassing said selected portion, to a temperature sufficient to permit uncombined metal therein to liquefy, and collecting the metal from at least one well into which it flows.

8. A method of heating in situ a selected portion of an underground ore body, comprising:
a. disposing at least one electrical conductor in at least one underground path whose shape and location are chosen to form, when voltage is applied across the ends of said conductor, an electric circuit substantially encompassing said portion; and
b. passing alternating electric current through said conductor of a magnitude and frequency and for a time selected to heat said portion by induction to a desired temperature.

3,988,037

METHOD OF BREAKING A HARD COMPACT MATERIAL, MEANS FOR CARRYING OUT THE METHOD AND APPLICATION OF THE METHOD

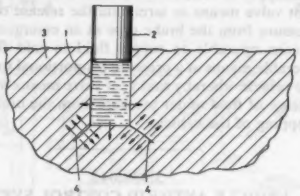
Jean-Paul Denisart, Lutry; Barry E. Edney, and Bo Lemcke, both of Lausanne, all of Switzerland, assignors to Institut Cerac SA, Vaud, Switzerland

Filed Apr. 17, 1975, Ser. No. 569,286

Claims priority, application Switzerland, Apr. 25, 1974, 5674/74

Int. Cl.² E21C 37/00

U.S. Cl. 299—16 40 Claims



1. A method of breaking a hard compact material, especially rock, having at least one hole pre-drilled in the material area to be broken, comprising:

filling said hole with a liquid by continuously injecting the liquid in said hole; and

impacting said liquid inside said hole with a piston driven therein for hydraulically pressurizing said liquid in said hole and initiating tensile stress cracks to form in said material area for generating a shock wave which is subsequently reflected from the bottom of said hole and the face of the piston to cause a rise of pressure in said hole.

3,988,038

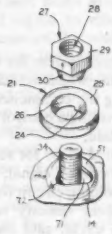
UNIVERSAL WHEEL SYSTEM

Raymond J. Hedlund, Benicia, Calif., assignor to FDI, Inc., Cleveland, Ohio

Filed July 14, 1975, Ser. No. 595,357

Int. Cl.² B06B 3/16

U.S. Cl. 301—9 DN 9 Claims



1. A universal wheel system for use on vehicles comprising:

wheel means having a hub portion and tire attachment means, said wheel means having in said hub portion a plurality of geometrically shaped orifice means, each having corners through which threaded lug bolts of a vehicle can protrude,

said corners of each said geometrically shaped orifice means corresponding to lug bolt patterns having at least three different radii,

each of said geometrically shaped orifice means radiating an equal distance from the center of said hub portion of said wheel means at a constant recurring angular displacement around said hub portion of said wheel means,

a plurality of locking insert means, each co-operating with a protruding lug bolt so as to locate and secure said lug bolt within said geometrically shaped orifice means when disposed about said lug bolt;

said locking insert means co-operating with said corners of said geometrically shaped orifices so as to describe lug bolt apertures through which said lug bolts protrude whereby a portion of the periphery of each said lug bolt aperture is formed by said locking insert means and the remainder of said periphery of each said lug bolt aperture is formed by said corner of each said geometrically shaped orifice, and

nut fastening means which secure said locking insert means into place whereby said lug bolt, said locking insert, and said orifice means are fastened into a fixed spatial relationship with one another.

3,988,039

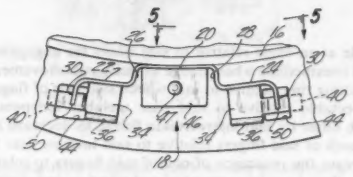
TRIM RING ASSEMBLY

Edward G. Spisak, 35700 Oakwood Lane, Westland, Mich. 48185

Filed Mar. 21, 1975, Ser. No. 560,996

Int. Cl.² A44B 21/00

U.S. Cl. 301—37 B 12 Claims



1. A trim assembly for a vehicle wheel having an axially extending terminal lip flange, a trim ring having an outer diameter generally coextensive with said lip flange, a plurality of retaining members spaced around the periphery of said trim ring, each of said retaining members having a pair of circumferentially spaced attaching portions with a configuration generally complementary to the outer periphery of said lip flange, an arm joining said pair of attaching portions and having an intermediate portion attached to said ring, a pair of gripping portions formed integrally with said arm and being spaced at opposite sides of said intermediate portion and adjacent to said pair of attaching portions, respectively, said attaching portions and gripping portions being resiliently deflectable away from each other and being engageable with opposite sides of said lip flange to retain said trim ring on said lip flange, one gripping portion and adjacent attaching portion being deflectable relative to said intermediate portion and independently of the other of said gripping portions and its adjacent attaching portion.

3,988,040

WHEEL TRIM ASSEMBLY

Edward G. Spisak, 35700 Oakwood Lane, Westland, Mich. 48185

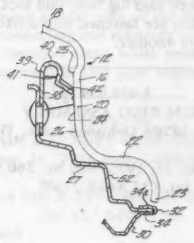
Filed Mar. 31, 1975, Ser. No. 563,604

Int. Cl.² B60B 7/06

U.S. Cl. 301—37 B 9 Claims

1. A wheel trim for a multi-flanged wheel of the type having a radially extending outer wheel flange forming a terminal lip portion, a radially extending outer flange, and an intermediate flange merging with said outer flange and diverging outwardly relative to the axis of said wheel, the combination comprising a retaining member, a plurality of retaining means mounted in annularly spaced relationship on said retaining member and being disposed between said intermediate wheel flange and said retaining member, each of said retaining means comprising a base member connected to said retaining member, a U-shaped portion merging with said base member and extend-

ing radially outwardly from said retaining member toward said wheel, a blade portion projecting radially outwardly from said U-shaped member and having a peripheral edge portion extending circumferentially of said wheel for engagement with an internal surface of said intermediate wheel flange, a pair of fingers extending generally radially from said base member at circumferentially spaced opposite ends thereof, said fingers diverging radially outwardly from each other, said U-shaped member being deflectable upon engagement of said blade portion with said intermediate wheel flange to position said



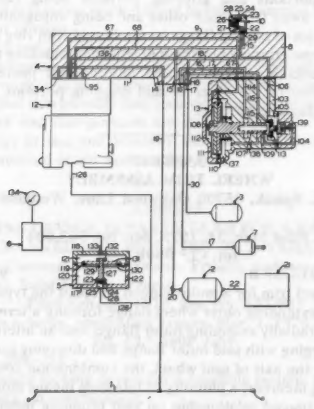
blade at an angle relative to said wheel for engagement with said intermediate wheel flange to resist axial movement of said retaining ring relative to said wheel, said pair of fingers being deflectable relative to said base member independently of each other by said intermediate flange to decrease the angle of each of said fingers relative to said intermediate flange to increase the resistance of one of said fingers to relative rotation of said retaining member and wheel in one direction and to increase the resistance of the other of said fingers to relative rotation in the opposite direction.

3,988,041

APPARATUS FOR PREVENTING RELEASE OF AN EMERGENCY BRAKE APPLICATION PRIOR TO A COMPLETE STOP OF THE TRAIN

Robert B. Morris, North Huntingdon, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Oct. 23, 1975, Ser. No. 624,758
Int. Cl.² B60T 8/02, 15/02
U.S. Cl. 303—21 R **12 Claims**



1. For use with a vehicle brake apparatus having a brake applying means and a normally charged brake pipe, variations of the pressure in said pipe cause said brake applying means to effect a brake application and a subsequent brake release, the combination of:

a. brake pipe vent valve means operable to release fluid under pressure from the brake pipe at an emergency rate,

b. emergency valve means responsive to a reduction of pressure in the brake pipe at only an emergency rate to simultaneously cause operation of the brake applying means to effect a brake application and said vent valve means to release fluid under pressure from the brake pipe, wherein the improvement comprises:

fluid pressure operable means responsive to the absence of the supply of fluid under pressure thereto to cause said vent valve means to terminate the release of fluid under pressure from the brake pipe at an emergency rate, and

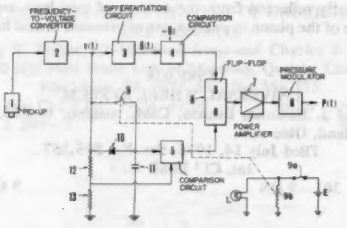
d. means operable to supply fluid to said fluid pressure operable means at a pressure proportional to the speed of the vehicle whereby said vent valve means terminates the release of fluid under pressure from the brake pipe upon stopping of the vehicle.

3,988,042

VEHICLE ANTISKID CONTROL SYSTEM

Kazuhiko Aoki, and Kennosuke Iida, both of Iwatsuki, Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 487,667, July 11, 1974, abandoned.
This application Oct. 30, 1975, Ser. No. 627,277
Claims priority, application Japan, July 21, 1973, 48-82193
Int. Cl.² B60T 8/08
U.S. Cl. 303—21 BE **6 Claims**



1. An antiskid control system for vehicles comprising:

means for converting wheel velocity into voltage signals;

means for detecting the commencement of a wheel locking state and for providing a control signal upon the detection of said locked state;

a brake pressure modulator for reducing brake pressure in response to said control signal;

a low peak value holding circuit for memorizing a minimum value of the wheel velocity voltage signal in a wheel velocity control cycle, said circuit including switching means which is normally conductive and which becomes non-conductive after said control signal appears, a condenser to which the wheel velocity signal is applied through said switching means when said switching means is conductive and means for allowing the condenser to discharge when the wheel velocity signal falls during a non-conductive condition of said switching means and for preventing condenser discharge when the wheel velocity signal reaches a minimum value; and

a comparison circuit for comparing the wheel velocity voltage signal and the memorized minimum value in said holding circuit, said memorized minimum value being the voltage across said condenser, said comparison circuit providing an output signal to stop the brake pressure reducing action of said modulator, said system thereby providing a substantially noisefree response to wheel velocity for controlling said brake pressure modulation.

3,988,043

INDIVIDUAL WHEEL ANTI-SKID BRAKE CONTROL SYSTEM EMPLOYING ELECTRONIC COMPARISON AND BRAKE PRESSURE DIFFERENTIAL LIMITING CIRCUITRY

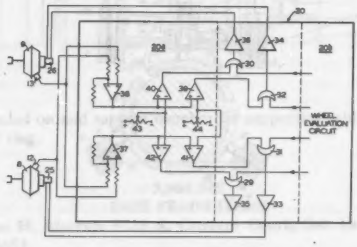
Erich Reinecke, Beinhorn, Germany, assignor to WABCO Westinghouse GmbH, Hannover, Germany

Filed Nov. 13, 1975, Ser. No. 631,505

Claims priority, application Germany, Dec. 20, 1974, 2460309

Int. Cl.[2] B60T *8/04*

U.S. Cl. 303—21 A 6 Claims



1. An anti-skid brake control system for a vehicle having independently rotatable wheels comprising:

a. a fluid pressure actuated brake cylinder device for each wheel;

b. a storage reservoir charged with fluid under pressure;

c. an operator controlled brake valve device for controlling the supply of fluid under pressure from said storage reservoir to each of said brake cylinder devices;

d. modulator valve means for regulating a respective wheel brake pressure independently of said brake valve device;

e. wheel evaluation means for effecting operation of said modulator valve means of a skidding wheel in such sense as to reduce the brake pressure thereat;

f. comparison means for comparing one wheel brake pressure with another wheel brake pressure and accordingly providing a control signal to effect operation of said modulator valve means of the wheel having the greater brake pressure, wherein the improvement comprises:

g. a transducer for converting each wheel brake pressure to a corresponding electrical signal;

h. said comparison means including:

i. first and second differential amplifier means having a positive input terminal subject to said electrical signal from said transducer of one wheel and a negative input terminal subject to said electrical signal from said transducer of the other wheel for producing an output signal according to the algebraic summation of said signals at said input terminals indicative of the difference in brake pressure between said one and said other wheel, the polarity of said output signals differing depending upon which wheel brake pressure is the greater and which is the lesser;

ii. first signal level detector means subject to said output signal from said first differential amplifier means for providing said control signal when said first differential amplifier output signal exceeds a predetermined threshold;

iii. second signal level detector means subject to said output signal from said second differential amplifier means for providing said control signal when said second differential amplifier output signal exceeds a predetermined threshold;

iv. bias means for establishing said predetermined threshold at which said first and second signal level detector means operate to provide said control signal.

3,988,044

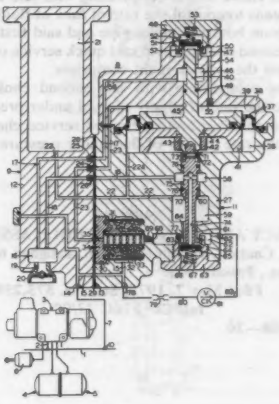
CONTINUAL QUICK SERVICE VALVE DEVICE WITH FAST CHARGING MEANS

Theodore B. Hill, North Versailles, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Dec. 22, 1975, Ser. No. 643,359

Int. Cl.[2] B60T *15/42*

U.S. Cl. 303—82 6 Claims



1. A cycling-type continual quick service means for a vehicle fluid pressure brake control apparatus operative in response to variations in pressure iin a normally charged brake pipe, said quick service means comprising:

a. a casing having formed therein a quick service chamber,

b. a movable abutment supported by said casing and subject to the pressure in the brake pipe in a first chamber on one side thereof and to the pressure in the quick service chamber in a second chamber on the other side, said abutment being movable responsively to the preponderance of pressure in either chamber over that in the other,

c. communication means via which to charge said first and second chambers and said quick service chamber from the brake pipe,

d. a first valve means normally closing a communication between said first chamber and atmosphere and operative by said abutment to open said communication to vent said first chamber and thereby the brake pipe to atmosphere responsively to movement of said abutment in one direction as a result of an operator-initiated reduction of pressure in the brake pipe,

e. a second valve means operatively connected to said abutment through a lost-motion connection and which opens said communication means to cause said quick service chamber and said second chamber to be charged from the brake pipe, said second valve means being operative by said abutment upon equalization of the pressures in said first and second chambers to cut off flow of fluid under pressure through said communication means to said second chamber and said quick service chamber, and being operative by said abutment, after said first valve means has opened said communication, to open a communication via which fluid under pressure is vented from said second chamber and said quick service chamber to atmosphere.

f. first choke means restricting the venting of fluid under pressure from said second chamber and said quick service chamber to such a rate as to insure the venting of fluid under pressure from the brake pipe to atmosphere by said first valve means for a certain predetermined time before the reduction of pressure in said second chamber and said quick service chamber is sufficient to cause a reversal of direction of movement of said abutment whereby said

abutment is effective, upon initial movement in the reversed direction, to cause operation of said first valve means to terminate further venting of fluid under pressure from the brake pipe and, upon further movement of said abutment in said reversed direction, is effective to operate said second valve means to terminate further venting of said second chamber and said quick service chamber,

g. second choke means cooperating with said communicating means to control the rate of flow of fluid under pressure from both the brake pipe and said first chamber to said second chamber and said quick service chamber, and wherein the improvement comprises:

h. means cooperating with said second choke means to enable the rate of supply of fluid under pressure to said second chamber and said quick service chamber to exceed the rate fo flow of flud under pressure therefrom.

3,988,045

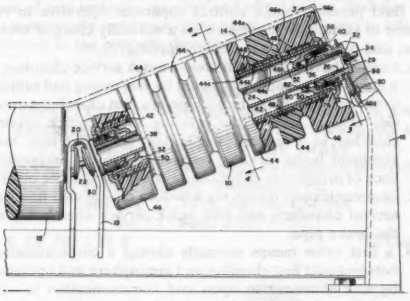
IMPACT ABSORBING IDLER ROLL ASSEMBLY

Ralph W. Coutant, Ho-Ho-Kus, N.J., assignor to Litton Systems, Inc., Passaic, N.J.

Filed May 7, 1975, Ser. No. 575,259

Int. Cl.² F16C *13/00*

U.S. Cl. 308—20 **20 Claims**



1. An impact absorbing idler roll assembly for supporting a conveyor belt, comprising, in combination;

a. an axially extending shaft that is circular when viewed in end elevation,

b. a tube shell positioned about said shaft and extending in the same axial direction,

c. said shell being but non-circular, when viewed in end elevation,

d. a plurality of resilient, abrasion and corrosion resistant discs, each disc comprising a body with a circumferential tread to support the conveyor belt and a thickened hub,

e. an aperture extending axially through each disc, said aperture being non-circular when viewed in end elevation,

f. said discs being retained upon said shell in slip-free relationship by the inherent resiliency of each disc, and

g. adapter means, including bearing means, situated between said shell and said shaft so that said shell and said discs can rotate in unison relative to said shaft when impact forces strike the discs.

3,988,046

RESILIENTLY MOUNTED GAS BEARING DEVICE

Hiroshi Okano, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

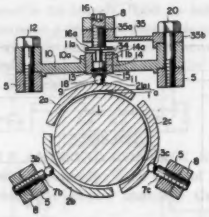
Filed Aug. 27, 1973, Ser. No. 391,797

Claims priority, application Japan, Apr. 5, 1973, 48-39198

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² F16C *17/06, 19/04, 23/04, 35/02*

U.S. Cl. 308—9 **7 Claims**



1. In a dynamic pressure gas bearing assembly for rotatably supporting a shaft having a plurality of bearing pads for supporting the shaft about the circumference thereof by means of a fluid layer between the shaft and the bearing pads during rotation of the shaft, the improvement comprising:

means for mounting one of said bearing pads and allowing movement of the pad toward and away from said shaft, said mounting means comprising:

resilient means having a relatively small spring constant and being deformable by relatively slow movement of said mounting means due to relatively slow buildup of fluid pressure between the shaft and said one bearing pad in order to absorb relatively small vibration or thermal expansion of said shaft,

a resilient member having a relatively large spring constant fixed to a support base in mechanical series relation with said resilient means and deformable by relatively high amplitude displacement of said mounting means in order to absorb shocks due to large forces on said shaft, and

vibration attenuating means for preventing movement of said one bearing pad away from the shaft in response to rapid increase in fluid pressure between the pad and the shaft that is substantially faster than the relatively slow increase in pressure due to relatively high frequency displacements of the shaft.

3,988,047

BEARING ASSEMBLY FOR A ROLL

Walter Küfner, Schweinfurt, Germany, assignor to SKF Industrial Trading and Development Company, B.V., Jutphaas, Netherlands

Filed Oct. 29, 1975, Ser. No. 626,648

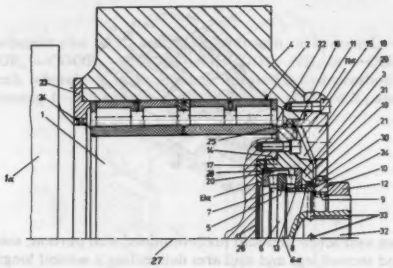
Claims priority, application Germany, Dec. 14, 1974, 7441723[U]

Int. Cl.² F16C *13/00*

U.S. Cl. 308—15 **12 Claims**

1. In a bearing assembly for a roll including a supporting member, roller bearing means mounted in said support member for radially supporting the journal of said roll, and bearing means mounted on said support member for axially supporting said journal comprising first and second outer housing rings and a central shaft ring therebetween and co-axial with said journal, said rings defining first and second races, and tapered roller bearings assembled in said races, the improvement

wherein said first and second outer housing rings are affixed to said journal of said roll, and further comprising means



mounted on said support member for supporting said central shaft ring.

3,988,048

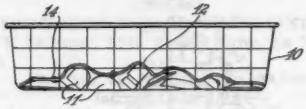
DISH STABILIZERS

James M. Murray, 9129 S. Crescent Court, Oak Lawn, Ill. 60453

Filed Sept. 23, 1974, Ser. No. 508,343

Int. Cl.[2] A47B *97/00*

U.S. Cl. 312—352 **1 Claim**



1. A stabilizer for dishes distributed in the work basket of a dishwashing machine, comprising a substantially horizontally disposed limp mesh adapted to be lowered to cover the dishes, and a plurality of weights attached to and distributed randomly across the surface of said mesh to depress sections of said mesh into the spaces between the dishes so as to drape portions thereof around the dishes when the mesh is lowered upon them, thereby to restrain the dishes from lateral and vertical movement in said basket during the dishwashing operation, said weights comprising spherical material covered with a cushioning material on the exterior, each weight having a crossed slot extending half-way through the diameter of the weight and a plug having a configuration substantially identical to the crossed slot to be driven into the weight to fasten at least one strand of said mesh therein.

3,988,049

APPARATUS FOR HIGH SPEED ROTATION OF ELECTRICALLY OPERATED DEVICES

Keith E. Williams, and Arnold J. Rogus, both of Valencia, Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 12, 1973, Ser. No. 396,609

Int. Cl. H01r *39/34*

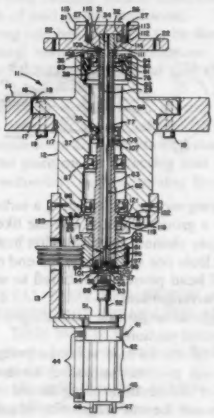
U.S. Cl. 339—5 M **11 Claims**

1. In a spindle apparatus for high speed rotation of a rotor means in which an elongate, solid, relatively slender, flexible drive shaft is connected to and for rotating said rotor means, the combination therewith of:

electromechanical means for transmitting a plurality of electrical signals from a stationary source to electrical conductors rotating with said shaft;

said electrical conductors extending longitudinally and externally of said drive shaft from said electromechanical means to and for connection to said rotor means; and

a plurality of conductor support members coaxially stacked on said flexible drive shaft, said members having a plurality of conductor support openings radially offset from



said shaft and being longitudinally aligned for holding and supporting said longitudinally extending conductors alongside said shaft, whereby said members provide support for said conductors against centrifugal forces occurring during high speed rotation without stiffening or otherwise restricting the flexibility of said shaft.

3,988,050

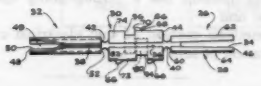
CONTACT RETENTION ASSEMBLY

Jack E. Langenbach, Newport Beach, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Jan. 21, 1976, Ser. No. 650,930

Int. Cl.[2] H01R *9/16*

U.S. Cl. 339—220 R **16 Claims**



1. An electrical contact adapted to be mounted in a contact cavity in an insulator of an electrical connector comprising:

an electrically conductive body having a forward contacting section, a rear termination section, and a tubular intermediate retention section;

a slot in said intermediate section extending longitudinally to the opposite ends thereof whereby said intermediate section is capable of radial contraction;

at least one outwardly extending barb on said intermediate section adapted to engage the wall of said cavity to retain said contact therein; and

means extending inwardly from the wall of said intermediate section defining a tool-receiving aperture therein, said means being adapted to cooperate with a tapered tool pushed into said aperture from either end of said body to contract said intermediate section and, thereby, release said barb from the wall of said cavity.

3,988,051

CLAMPING MEANS FOR CLASPING TERMINAL POSTS

Charles T. Robinson, 604 Barbara Road, Landing, N.J. 07850

Filed Aug. 18, 1975, Ser. No. 605,519
Int. Cl.² H01R 11/00
U.S. Cl. 339—238 7 Claims

1. Clamping means, for clasping a terminal post of a storage battery, or a grounding rod, and the like, comprising:

an elongate element, having a first head on one end thereof and at least one channel on the end opposite said one end;

a second head pivotally-mounted to said first head;

a toggle arrangement;

said toggle arrangement including a plurality of pivotally connected sections;

one end of one of said sections being pivotally connected with said pivotally-mounted head, the free end of another of said sections being nested in said one channel for movement thereof lengthwise of said one channel;

a fulcrum carried by said elongate element with which said free end of said another section engages, to delimit the lengthwise movement of the latter;

lever means extending from one of said sections for activating said toggle arrangement, to cause said pivotally-mounted head to pivot, and to cause said another section to pivot upon said fulcrum, to move said heads into and out of proximity with each other toward and away from a terminal post, grounding rod, and the like;

said lever means and said toggle arrangement being cooperative to lock said heads in close proximity;

an electrical conductor; and

means effecting a coupling of said conductor to, and in electrical continuity thereof with, at least one of said heads; wherein

one of said first and second heads has a base portion and a shank portion;

said base portion has a terminal end of said electrical conductor coupled thereto;

said shank portion has a throughgoing aperture formed therein; and

an intermediate portion of said electrical conductor is in penetration of said aperture.

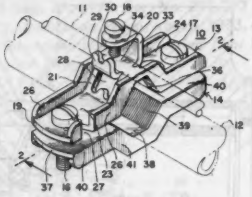
3,988,052

GROUND CLAMP

Thomas Mooney, Mount Sinai, N.Y.; Richard A. Bauer, Etters, Pa., and Stephen Veselaski, Shirley, N.Y., assignors to I-T-E Imperial Corporation, East Farmingdale, N.Y.

Filed June 30, 1975, Ser. No. 591,410
Int. Cl.² H01R 7/08
U.S. Cl. 339—265 R 6 Claims

1. A conduit grounding device comprising a pair of first and second conduit clamp members relatively movable between an open conduit release and a closed conduit clamping position and delineating a clamp engaging longitudinal passageway, said first clamp member including a laterally extending web having stamped therefrom to leave a corresponding first opening therein, an outwardly extending first leg terminating in a raised laterally projecting arm directly overlying a predetermined portion of said web and having a tapped vertically extending bore therein and said first clamp member laterally extending web having stamped therefrom to leave a corresponding second opening therein laterally spaced from said first opening an outwardly extending second leg having a free end transversely spaced from the free end of said arm, and a screw engaging said tapped bore and adapted to clamp a cable



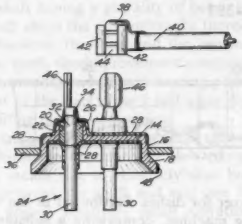
between said screw and said predetermined web portion, said first and second legs and said arm delineating a second longitudinal passageway and the proximate edges of said arm and second leg delineating a lateral passageway into said second longitudinal passageway.

3,988,053

HERMETIC TERMINAL

John A. Dodenhoff, 136 East Hill Drive, Cranston, R.I. 02920

Filed Jan. 20, 1975, Ser. No. 542,413
Int. Cl.² H01R 13/52
U.S. Cl. 339—278 C 12 Claims



7. A conductor pin for a hermetic termial comprising three solid cylindrical sections each constructed of a different material and each having substantially the same outer diameter, said sections connected to each other in tandem so as to provide an elongated, three-section pin having a substantially smooth, uninterrupted outer surface, one end section of the pin being constructed of any suitable electrically conducting material capable of meeting the current-carrying requirements of the terminal, the other end section of the pin being constructed of an electrically conductive, corrosion-resistant metal, and the intermediate section being constructed of a sealing alloy.

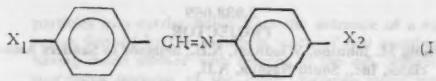
3,988,054

NEMATIC LIQUID CRYSTAL COMPOSITIONS

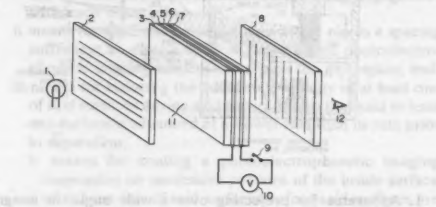
Masachika Yaguchi, Yokohama; Toshio Jinnai, Kamakura; Mikio Shirotsuka, Kamakura, and Kazuo Totani, Kamakura, all of Japan, assignors to Dai Nippon Toryo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 23, 1974, Ser. No. 463,228
Claims priority, application Japan, Apr. 24, 1973, 48-46543; June 30, 1973, 48-73325
Int. Cl.² G02F 1/13; C09K 3/34
U.S. Cl. 350—160 LC 10 Claims

1. An electro-optical element comprising a pair of electro plates including a thin layer of a nematic liquid crystal composition having positive dielectric anistropy comprising a mixture of 0.5 – 90 weight % of at least one of compounds represented by the formula



wherein one of X_1 and X_2 is hydrogen or hydroxyl, —R, —OR, —COOH, —COOR, —NHCOR, —NH_2 or —COR radicals wherein R is an aliphatic saturated hydrocarbon group having 1 – 20 carbon atoms, when the other of X_1 and X_2 is



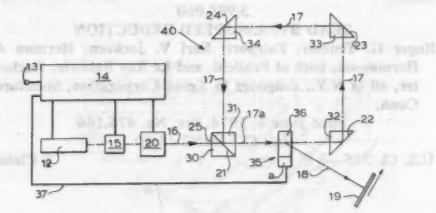
halogen, or X_1 is hydrogen, halogen or hydroxyl, —R, —COOH, —COOR or —NHCOR radicals wherein R is as defined above, when X_2 is a nitro radical or X_2 is hydrogen, halogen or hydroxyl, a straight alkyl of more than 5 carbon atoms or —COOH, or —COOR radicals wherein R is as defined above, when X_1 is a nitro radical, provided that when X_2 is halogen and X_1 is a nitro radical, the corresponding 2- and 5- positions are substituted by halogen, and 10 – 99.5 weight % of a nematic liquid crystal material.

3,988,055

LIGHT OPTIC DATA HANDLING SYSTEM

Joseph T. McNaney, 8548 Boulder Drive, La Mesa, Calif. 92041

Filed Aug. 26, 1975, Ser. No. 608,016
Int. Cl.² G02B 5/23
U.S. Cl. 350—160 R **3 Claims**



1. light optic data handling system comprising:

a. a source of light and means for directing an individual beam of light therefrom along a primary optical path within said system so as to establish an availability of light of said beam at a plurality of predetermined locations along said path for a redirecting of said light from a selected one of said locations and thereupon along a corresponding one of a plurality of secondary optical paths stemming, respectively, from said locations, each said location representative of an output position of said system;

b. said means including an array of at least three light reflecting surfaces, each surface presenting a length dimension and each surface positioned substantially parallel one with respect to the other in a predetermined spaced apart relationship, said array of surfaces angularly oriented so as to establish an optical relationship one with respect to the other for allowing said beam of light to be directed along said primary path forming a helix of plural revolutions, each revolution including at least one of said locations at which said light will be made available for said redirecting thereof along a corresponding secondary path;

c. a plurality of individually controlled OFF or ON conditioned light beam deflection control means positioned intermediate two succeeding surfaces of said array and extending along said length dimension thereof, the position of each of said control means coinciding, respectively, with each of said output positions;

d. means for allowing said beam of light to be directed along said helix of plural revolutions in response to an OFF conditioned control means at each of said output positions;

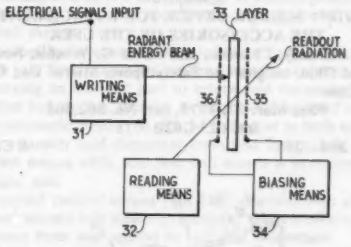
e. means for establishing a diffraction grating coincident with the control means at a selected one of said output positions in response to an ON conditioned control means at said one output position for effecting said redirecting of light along a secondary path stemming from said one output position.

3,988,056

LIQUID-CRYSTAL DISPLAY METHOD AND INFORMATION-PROCESSING APPARATUS APPLYING THIS METHOD

Michel Hareng, and Serge Le Berre, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Nov. 18, 1975, Ser. No. 632,954
Claims priority, application France, Nov. 21, 1975, 75.38284
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC **7 Claims**



1. A method for displaying a radiant energy pattern corresponding to a logical combination of two original patterns, each of said original patterns being produced in accordance with two distinct incoming electrical signals, said method comprising in the following order the steps of:

thermally writing in one of said original patterns onto a layer of smectic liquid-crystal under the control of one of said electrical signals;

thermally writing in the other of said original patterns onto said layer under the simultaneous control of the other of said electrical signals and of a reorienting biasing voltage applied across said layer;

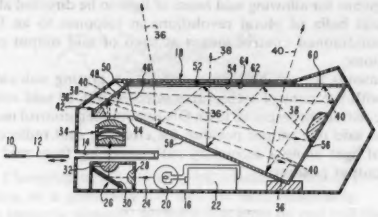
and supplying to said layer a read-out radiation for reading out said radiant energy pattern.

3,988,057

PRISM REFLECTOR FOR OPTICAL PROJECTOR/READER

Narinder S. Kapany, Woodside, and Fred C. Unterleitner, Palo Alto, both of Calif., assignors to Kaptron, Inc., Palo Alto, Calif.

Division of Ser. No. 518,254, Oct. 29, 1974, Pat. No. 3,941,467. This application Aug. 13, 1975, Ser. No. 604,186
Int. Cl.[2] G02B 5/04, 5/08
U.S. Cl. 350—286 4 Claims



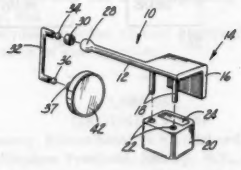
1. Optical apparatus for projecting a light beam comprising a prism having a transparent first surface, a flat, transparent second surface, a metal coated, reflecting third surface opposite to the first surface and forming a predetermined, acute angle with the second surface such that the major portion of a light beam passing through the first surface will be reflected by the reflecting, third surface to the second surface at an incident angle greater than the critical angle for total internal reflection by the second surface, and a metal coated, reflecting fourth surface angularly facing the second surface such that said light beam reflected internally by the second surface will directly strike the fourth surface and be reflected by the fourth surface back to the second surface at an incident angle which is less than the critical angle for the second surface.

3,988,058

REAR-VIEW MIRROR DEVICE FOR ATTACHMENT TO THE ACCESSORIES OF THE USER

David R. Chaney, Chardon, and David G. Wendel, Novelty, both of Ohio, assignors to Safety Sports Mirror Co., Chardon, Ohio

Filed Mar. 27, 1975, Ser. No. 562,505
Int. Cl.[2] G02B 7/18
U.S. Cl. 350—298 8 Claims



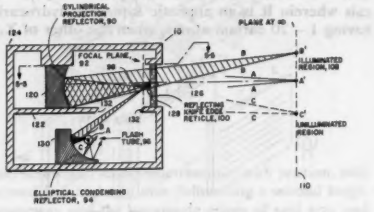
1. A rear-view mirror assembly for attachment to the frame of eyeglasses, goggles, peaks of caps, and the like comprising,
an elongated body member having attachment means at one end thereof,
a generally U-shaped mirror supporting member,
first ball and socket means frictionally swivelly connecting one leg of said mirror supporting member to the opposite end of said body member for universal movement,
a mirror and means mounting said mirror,
second ball and socket means frictionally swivelly connecting the other leg of said mirror supporting member to said means mounting the mirror for universal movement,
whereby to provide maximum adjustment of said mirror.

3,988,059

PROJECTOR

Philip M. Johnson, Windham, N.H., assignor to Sanders Associates, Inc., South Nashua, N.H.

Filed June 23, 1975, Ser. No. 589,289
Int. Cl.[2] G03B 21/00
U.S. Cl. 353—122 17 Claims



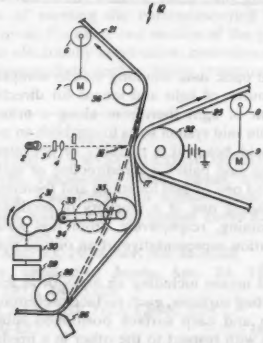
1. Apparatus for projecting over a wide angle an image having an illuminated and unilluminated region with a boundary region therebetween comprising:
a line source of light having a finite thickness;
an elongated reticle having a line portion defining said boundary region;
means for focusing the light from said line source so as to form an image of said line source substantially coextensive with and colinear with the line portion of said reticle such that said reticle permits transmission of only a portion of light from said line source; and
reflective focusing means elongated in one dimension so as to have a locus of focal points extending in the direction of the line portion of said reticle for focusing the light permitted to be transmitted by said reticle at infinity such that an image having an illuminated and unilluminated region and a well defined boundary region therebetween exists over a wide angle at a substantial distance from said apparatus.

3,988,060

BEAD BYPASS SPEED REDUCTION

Roger G. Teumer, Fairport; Earl V. Jackson; Herman A. Hermanson, both of Penfield, and Le Roy Baldwin, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed June 4, 1974, Ser. No. 476,186
Int. Cl.[2] G03G 15/00
U.S. Cl. 355—3 P 9 Claims



1. Apparatus for photoelectrophoretic imaging comprising
a. means for removing a bead of accumulated photoelectrophoretic imaging suspension of electrically photosensitive

particles in a carrier liquid from the entrance of a nip region formed by two members, each of said members having inside surface with respect to the nip, wherein successive portions of the inside surfaces move into contact with each other at the nip comprising

i means for advancing said successive portions of said members into contact with each other at the nip including means to advance at least one of said surfaces relative to the nip region so that any bead portion carried on said at least one surface is advanced beyond the nip region when the surfaces are separated from contacting engagement with each other other;

ii means for separating said surfaces at the nip to a spacing suffficient to allow a bead of accumulated photoelectrophoretic imaging suspension to pass the nip region; and

iii means for reducing the advancing velocity of at least one of said surfaces during said separation so that said at least one surface is advanced at a slower rate than its rate prior to separation;

b. means for coating a photoelectrophoretic imaging suspension on successive portions of the inside surface of at least one of said surfaces before said surfaces are brought into contact to form the nip;

c. means for applying an electrical field across said imaging suspension at least when said surfaces are in contact at the nip with the imaging suspension therebetween; and

d. means for imagewise exposing said suspension at the nip to an image of activating electromagnetic radiation at least when said surfaces are in contact at the nip with the imaging suspension therebetween.

3,988,061

PRESSURE FIXING OF TONERS

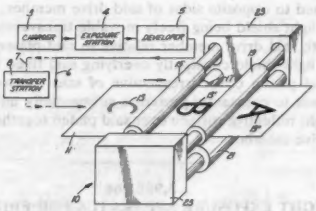
Russell L. Root, Shaker Heights, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 1, 1974, Ser. No. 493,501

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² G03G *13/00*

U.S. Cl. 96—1 SD **4 Claims**



1. The method of providing a permanent image on a substrate, wherein the image is a fixed dry powder image of electroscopic toner powder having a predetermined threshold pressure and wherein fixing is achieved solely by the application of pressure applied to the powder image on the substrate, comprising:

the steps of creating an electrostatic charge pattern in image configuration;

depositing dry electrostatic toner powder upon said substrate to form an image pattern configuration under the electrical control of said charge pattern;

and fixing the toner power image to said substrate, wherein the last mentioned step includes:

a. applying to said imaged substrate a pressure less than said threshold pressure by means of an unheated pressure member; and

b. repeating the procedure of step a) one or more times to ultimately pressure fix said powder image upon said substrate.

3,988,062

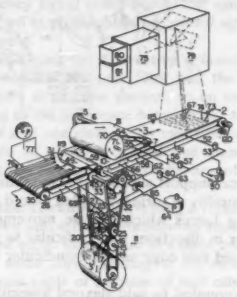
TWO-SIDED DOCUMENT RECORDER

John S. Burton, Los Angeles, and Ronald L. Whitney, San Fernando, both of Calif., assignors to Terminal Data Corporation, Woodland Hills, Calif.

Division of Ser. No. 526,491, Nov. 25, 1974, abandoned. This application July 18, 1975, Ser. No. 597,044

Int. Cl.² G03B *27/32, 27/52;* **B65H** *29/66*

U.S. Cl. 355—23 **7 Claims**



1. A document recorder, having means for feeding and photographing both sides of a document, comprising:

a. first belt means (**10**) to translate a document to a photographing station (**67**),

b. first control means (**73, 74, 171**) to stop said first belt means, and after a time interval to accommodate photographing to reverse the direction of motion of said first belt means,

c. second belt means (**8**) disposed in part adjacently parallel to said first belt means, having a curvilinear part, and also having an inclined part to return said document to said first belt means, thereby to turn said document over,

d. pneumatic means (**51, 55, 54**) adjacent to both said belts to transfer said document from said first to said second belt means while said first belt means is in reversed motion, and

e. second control means (**70, 130**) coactive with said first and second belt means to reconvey said transferred document from said second to said first belt means

and thereon again to said photographing station to accommodate photographing the second side thereof.

3,988,063

FORM SLIDE LOCATING APPARATUS FOR USE IN COMPUTER OUTPUT MICROFILMERS

David D. McNair, Webster, and Alvin L. Schubert, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 14, 1975, Ser. No. 604,561

Int. Cl.² G03B *27/52*

U.S. Cl. 355—40 **3 Claims**

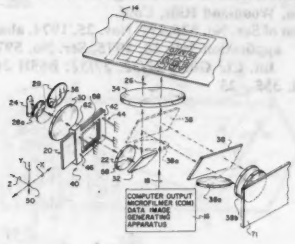
1. Apparatus for precisely locating a form slide in a Computer Output Microfilmer or the like where said form slide is mounted in a rectangular frame having a side surface generally parallel to the plane of the slide and also having an edge which defines a surface perpendicular to said side surface, said apparatus comprising:

a. a retainer assembly including:

i. a movable plate member;

ii. means mounted on said plate member for receiving, capturing, and accurately positioning said form slide frame in said plate member; and

iii. said receiving means including means defining a first reference plane for locating said side surface of said frame and means defining a second reference plane for locating said edge surface of said frame;



b. a flexural support assembly for mounting said plate having a plurality of springs coupled to said plate member for applying forces which oppose movement of said plate member in directions perpendicular to said side surface, along said side edge and perpendicular to said side edge; and

c. means coupled to said flexural assembly for selectively moving said plate member in said directions against the forces applied by said springs to precisely locating said form slide.

3,988,064

READER-PRINTER

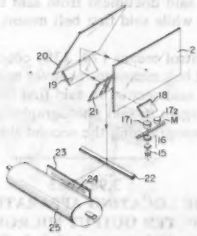
Yoshiaki Sone, and Takamasa Sawada, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1974, Ser. No. 519,776

Claims priority, application Japan, Nov. 13, 1973, 48-127539; Nov. 13, 1973, 48-127540; Dec. 21, 1973, 48-2067

Int. Cl.² G03B 27/52

U.S. Cl. 355—41 **24 Claims**



1. A reader-printer comprising means for projecting an image in a recorded medium, screen means for receiving the image projected, a photosensitive medium for receiving the image projected thereon, means for moving said photosensitive medium, means for detecting the location of an image in the recorded medium to produce a detection signal, and means operative in response to the detection signal for moving the recorded medium to a reading position at which the projected image is viewed through said screen means and to a printing position where the projected image is recorded on said photosensitive medium.

3,988,065

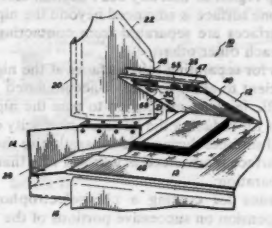
REFLECTIVE DOCUMENT FEEDER

Raymond P. Mileski, Fairport; Henry T. Bober, and James O. Mitchel, both of Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 21, 1975, Ser. No. 579,338

Int. Cl.² G03B 27/32, 27/52; B65G 15/00, 17/00

U.S. Cl. 355—64 **4 Claims**



1. In a copying apparatus with a document copying platen, and an overlayable light reflective platen cover for holding documents against said platen for illuminated copying thereon, and document drive means in said platen cover for driving a document on said platen, the improvement wherein:

said document drive means comprises at least one endless surfaced rotatable document drive member having a light reflective endless surface partially extendable through a minor fixed aperture in said platen cover towards said platen,

said endless surface of said drive member having a substantially constant width transverse its direction of rotation,

said fixed aperture in said platen cover being wider than said endless surface of said drive member transversely of said direction of rotation of said endless surface to allow limited transverse movement of said drive member relative to said platen cover, and

wherein a light reflective shield, having an aperture of substantially the same width of said endless surface of said drive member, is movably mounted relative to said platen cover with said drive member extending through said light shield aperture and with said light shield closely fitted to opposite sides of said drive member,

said light shield being freely movable transversely together with said drive member relative to said platen cover,

said light shield constantly overlying said fixed aperture in said platen cover irrespective of said transverse movement to constantly present a substantially uninterrupted light reflective surface over said platen together with said drive member.

3,988,066

LIGHT EXPOSURE APPARATUS FOR PRINTING

Akiyoshi Suzuki, Tokyo, and Ichiro Kano, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Japan

Filed Dec. 30, 1974, Ser. No. 537,323

Claims priority, application Japan, Jan. 12, 1974, 49-6908

Int. Cl.² G03B 27/02; G02B 27/00

U.S. Cl. 355—78 **15 Claims**

1. A light exposure apparatus for printing comprising:

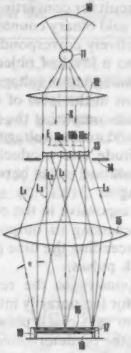
a light source;

a converging optical system arranged to substantially collimate the rays coming from said light source;

a multiple flux generating assembly arranged in the path of a flux of rays exiting from said condenser lens system to form a great number of component fluxes while causing each of the component fluxes to spread;

a collimating lens system disposed with its primary focal point substantially coinciding with a plane containing the origins of the component fluxes formed by said multiple flux generating assembly;

a mask carrying a microscopic pattern constructed in the form of an array of light-permeable and light-impermeable regions; and



mask supporting means supporting said mask above the surface on which an image of the mask is projected and spaced apart therefrom by a distance which is in the order of microns;

whereby said collimating lens system collimates said component fluxes which illuminate said mask.

3,988,067

AUTOMATIC POLARIZATION ANALYZING DEVICE

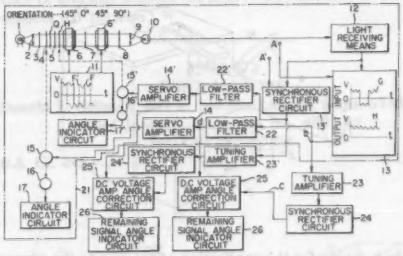
Tadaaki Yamamoto, Tokyo; Toshiyuki Kasai; Yoshihiro Kaizawa, both of Kawasaki, and Sakuji Watanabe, Urawa, all of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Continuation-in-part of Ser. No. 425,811, Dec. 18, 1973, abandoned. This application Feb. 4, 1975, Ser. No. 546,903

Claims priority, application Japan, Dec. 22, 1972, 47-128245

Int. Cl.[2] G01N *21/40*

U.S. Cl. 356—117 **4 Claims**



1. An automatic polarization analysing device comprising a polarization analysing optical system including at least a light source and first and second light modulators for simultaneously modulating a beam of light by two different AC square wave signals such that one of said AC square wave signals is a composite of a basic signal frequency (*f*) plus an automatic amplitude compensation signal frequency (fo) which is higher than the basic signal frequency (fo>*f*), the polarization analysing optical system being operable to generate two light signals modulated by said two light modulators which signals correspond respectively to two polarization variables of a sample,

a photoelectric conversion means for converting said two light signals to two electric signals,

a first synchronous rectifier circuit for deriving and rectifying one of said two electric signals,

a second synchronous rectifier circuit for deriving and rectifying the other of said two electric signals,

a first servo motor arranged to rotate one element of said optical system in accordance with the signal from said first synchronous rectifier circuit,

a second servo motor arranged to rotate the other element of said optical system in accordance with the signal from said second synchronous rectifier circuit,

a first and second means for indicating the angles of rotation of said elements,

a low-pass filter connected to receive the signal from said first synchronous rectifier circuit and to interrupt the higher frequency signal component (fo), said filter also being connected to provide driving control signals to said first servo motor,

a first operation circuit for converting a remaining error voltage between the low-pass filter and the first servo motor, due to a dead zone thereof, to an output value corresponding to the difference between the actual angle of rotation of said one element by said first servo motor and that angle of rotation of said one element which would have been obtained in the absence of said dead zone,

a second operation circuit for converting a remaining error voltage between said second synchronous rectifier circuit and the second servo motor, due to a dead zone thereof, to an output value corresponding to the difference between the actual angle of rotation of said other element by said servo mtor and that angle of rotation of said other element which would have been obtained in the absence of said dead zone,

amplitude compensating signal detecting means connected to receive the signal from said first synchronous rectifier circuit, and to derive and rectify only the higher frequency signal component (fo) to generate an amplitude correction signal which corresponds to the variation in the emergent light quantity from said polarization analyzing optical system which variation is caused by deterioration of said light source or the like, said compensating signal detecting means being connected to transmit said amplitude correction signal to both said first and second operation circuits;

a third indicating means for indicating an output value from said first operation circuit, and

a fourth indicating means for indicating an output value from said second operation circuit,

whereby said first and second operation circuits receive said amplitude correction signal and said remaining error voltages, respectively, and convert them to said output values which correspond to angles of rotation through which said two elements have not been rotated in correspondence with the emergent light quantity from the polarization analysing optical system, said third and fourth indicating means indicating said angles, respectively.

3,988,068

METHOD AND APPARATUS FOR DETECTING COSMETIC DEFECTS IN OPTHALMIC LENSES

Robert A. Sprague, Chelmsford, Mass., assignor to Itek Corporation, Lexington, Mass.

Continuation-in-part of Ser. No. 468,604, May 9, 1974, abandoned. This application Dec. 19, 1974, Ser. No. 534,322

Int. Cl.[2] G01N *21/32*

U.S. Cl. 356—124 **25 Claims**

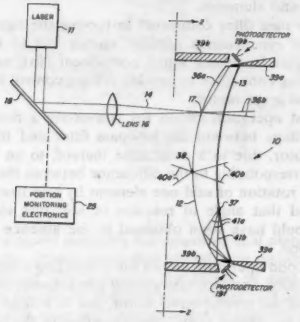
1. Apparatus for detecting and analyzing defects on or beneath the surface of a lens comprising:

a. means for supporting said lens in position to be examined, said lens having first and second opposed surfaces and a peripheral edge;

b. examining means for examining said lens for defects located on or beneath said first surface thereof from a plurality of examining positions around the peripheral edge thereof, said examining means including:

1. light source means for directing light through said lens, and,

2. detector means positioned at a location removed from the normal path of said light passing through said lens but positioned to receive light directed thereto as a



result of said light striking a defect in said lens, which defect causes at least a portion of said light to be scattered out of its normal path through said lens to impinge upon said detector means, said detector means including means for generating a plurality of output signals representative of the light impinging thereon, said plurality of signals corresponding to said plurality of examining positions from which said lens is examined, and,

c. means for comparing said plurality of output signals for analyzing said defect as a function of the scattering profile of the light scattered thereby.

3,988,069

AUTOMATIC CONTROL DEVICE FOR CAMERAS

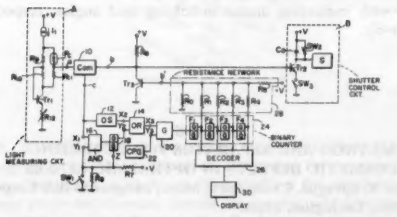
Mashio Kitaura, Tondabayashi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 3, 1973, Ser. No. 385,279

Claims priority, application Japan, Aug. 3, 1972, 47-77847; Aug. 3, 1972, 47-87476

Int. Cl.[2] G01J *1/42*

U.S. Cl. 356—218 **7 Claims**



1. A digital indicator device for a camera for providing a digital indication of a first analog input voltage, the digital indicator device comprising:

a clock pulse generator circuit for producing clock pulses of a given repetition rate,

a binary counter for counting the clock pulses from said clock pulse generator circuit and producing successive digital count outputs,

a D-A converter circuit for converting the successive digital count outputs of said binary counter into a second analog voltage of respectively corresponding amplitude values,

means responsive to a level of object illumination to produce said first analog input voltage varying in amplitude with the variations in the level of object illumination,

a comparator circuit comparing the first analog input voltage with the second analog voltage of said D-A converter circuit in magnitude and producing an output when a predetermined relation exists between the first and second analog voltages,

a one-shot circuit responsive to the output of said comparator circuit for reversing its output for a predetermined period of time exceeding the time period of the repetition rate of said clock pulses,

circuit means responsive to the reversed output of said one-shot circuit for temporarily interrupting supply of the clock pulses from said clock pulse generator to said binary counter for the predetermined period of time during which the output of said one-shot circuit is reversed,

indicating means having a plurality of indicator devices selectively energizable to indicate respectively corresponding digital count outputs of said counter, and

decoder means for selectively and sequentially energizing corresponding ones of said plurality of devices in accordance with the digital count outputs of said binary counter, whereby said devices are energized individually and in succession in accordance with the successive digital count outputs, and whereby the energizing time of the device indicative of the first analog input voltage is longer than those of the other of said plurality of devices.

3,988,070

SKI WAX APPLICATOR

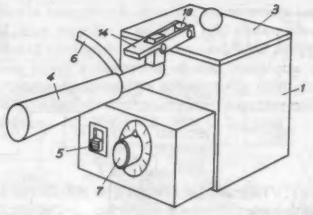
Hans Jörg Tobler, Altstatten, and Hansruedi Lüchinger, Oberriet, both of Switzerland, assignors to Tobler Holding AG, Altstatten, Switzerland

Filed June 3, 1975, Ser. No. 584,239

Claims priority, application Austria, June 4, 1974, 4615/74

Int. Cl.[2] A63C *11/07*

U.S. Cl. 401—2 **3 Claims**



1. In a device for the application of ski wax to the running surface of a ski, said ski having a longitudinal groove on the running surface, by means of an electrically heatable wax container, the outside bottom surface of said container serving as an application surface, at least one wax discharge opening connected with the wax container by way of at least one closeable channel, heating means inside said container, the improvement comprising: a portion of the bottom surface displaced in relation to the remaining portion of the bottom surface, said displaced portion of said bottom surface having two approximately triangular surface portions thereon, each triangular surface portion having at least one wax discharge opening disposed thereon and in communication with said wax container by at least one channel such that wax is discharged on opposite sides of the longitudinal groove onto the

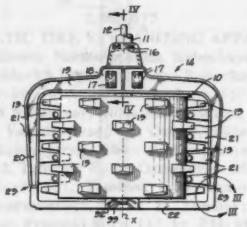
running surface, said channel being selectively closed by a valve from said wax container and said remaining portion of said bottom surface being flat and heated by said heating means to uniformly coat the running surface of said ski.

3,988,071

CLEANING BAR ASSEMBLY FOR COMPACTOR WHEELS

Thomas Eugene Cochran, Yorkville, and Rodger Lloyd Moring, Bristol, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 13, 1975, Ser. No. 604,278
Int. Cl.² E01C *19/26*
U.S. Cl. 404—129 **8 Claims**



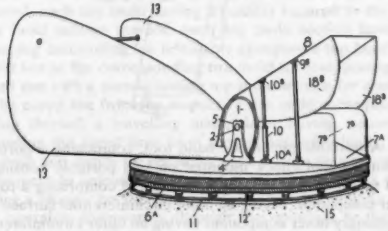
1. In a vehicle comprising an axle housing, a compactor wheel rotatably mounted on said axle housing for rotation about a central longitudinal axis thereof and having a plurality of circumferentially disposed pads secured on the periphery thereof to extend radially outwardly therefrom and a cleaning bar assembly secured to said axle housing, the invention wherein said cleaning bar assembly constitutes an integrally formed U-shaped frame having an inboard support bar disposed transversely relative to said axis and secured to said axle housing, a pair of legs cantilevered on said support bar to straddle said compactor wheel on either side thereof and disposed in parallel relationship relative to said axis, a plurality of cleaning bars secured to each of said legs to extend inwardly therefrom towards said axis and between respective ones of said pads, and an adapter means secured on an end of each of said legs adapted for selectively attaching an outboard support bar thereon.

3,988,072

WIND MOTORS

Donald L. Sellman, 407 S. 3rd St., Lincoln, Kans. 67455

Filed June 28, 1974, Ser. No. 484,148
Int. Cl.² F03D *5/04*
U.S. Cl. 415—3 **4 Claims**



1. A wind motor that is impelled by the impact of the wind against the vanes of an impeller rotor that travels in the same direction as the wind comprising:

a. a base comprising a substantially flat platform which has a front and rear side;

b. bearing supports whose bottom sides are attached to the top side of the base platform, the top side of said bearing supports hold the bearings that journal a horizontal axel shaft, which axel shaft has an impeller rotor mounted thereon;

c. on the perimeter rim of said impeller rotor are arranged cup shaped impeller buckets which face toward the front side of the base platform, these cup shaped buckets are recessed back from the bottom side forming a substantially semi-circle with the top portion reaching towards the front, these cup shaped buckets are closed at each side to prevent side slip-by of the wind;

d. the impeller rotor is large in diameter so as to have a large circumference with many impeller buckets on its perimeter rim so as to provide maximal torque from a slow wind and also provide a fly wheel stability between intermittent puffs of wind;

e. a bottom-side wind channel member which is a substantially flat incline plane type platform whose front end is hinged to the front end of the base platform, the rear end of this bottom-side wind channel member is connected to the lift arm of a lift mechanism, this lift mechanism is attached to the top side of the base platform so as to hold this bottom-side wind channel member at the right height to direct the oncoming wind against the impeller buckets;

f. a top-side substantially flat wind channel member which is located directly above the bottom-side wind channel member and whose length and width measurements are substantially the same as the bottom-side wind channel member, the front end of this top-side wind channel member extends substantially above the top of the impeller rotor and gradually slopes downward so that the back side is substantially at the same height as the impeller rotor, the upper wind channel member is pivoted near the center by structure extending up from the base platform, the lift arm of a lift mechanism is connected to the rear half of the top-side wind channel member, said lift mechanism is attached to the upper side of the base platform so as to hold the upper wind channel member in position to direct the oncoming wind against the impeller buckets;

g. and the base platform has mounted on its underside wheel supports with wheels so that with the wheels standing on a firm circular roadbed the wind motor can be turned in a circle so as to face the oncoming wind.

3,988,073

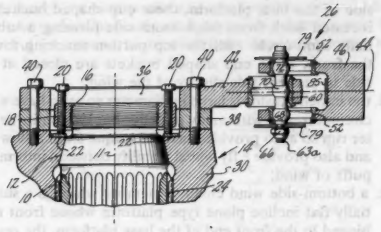
SPHERICAL BIFILAR TUNING PIN BUSHING

Larry B. Eastman, Milford, and Irwin J. Kenigsberg, Trumbull, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 11, 1975, Ser. No. 567,158
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² B64C *27/32*
U.S. Cl. 416—145 **13 Claims**

1. A bifilar absorber for helicopter rotors including a pendulous element, an absorber support member carried by the rotor, said element and said member having sets of matching large-diameter tracking apertures, tracking inserts in said apertures having shallow peripheral grooves which are arcuate

in cross section, and a tuning pin assembly extended through each set of matching apertures including an axial pin and a



plurality of spherical tuning bushings on said pin in position to cooperate with the grooves of its set of tracking inserts.

3,988,074

ANHEDRAL BIFILAR

Irwin Jeffrey Kenigsberg, Trumbull, and Edward Sterling Carter, Fairfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 13, 1975, Ser. No. 631,577

Int. Cl.² B64C *27/32*

U.S. Cl. 416—145 **15 Claims**

1. In a helicopter, a rotor drive shaft, a rotor hub on said shaft, a plurality of rotor blades secured to and extending radially from said hub, a plurality of bifilar absorbers rotatable with said hub, a support member for said absorbers including a concentric central ring portion fixed to said hub and rotatable therewith in a plane parallel to the plane of blade rotation, said ring portion having a plurality of star points extending radially therefrom at spaced points about its periphery having end portions deflected downward out of the plane of said ring portion, and an absorber mounted at the extremity of each point.

3,988,075

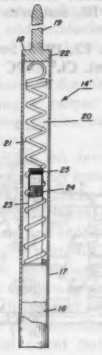
NUCLEAR FUEL ELEMENT

Richard T. Penrose, Los Gatos, and John R. Thompson, San Jose, both of Calif., assignors to General Electric Company, San Jose, Calif.

Division of Ser. No. 253,299, May 15, 1972. This application Mar. 2, 1973, Ser. No. 337,547

Int. Cl. G21c *3/02*

U.S. Cl. 417—48 **6 Claims**



1. A method of protecting the cladding of a nuclear fuel element from internal attack comprising the step of incorporating in the fuel element an effective amount of an additive selected from the group consisting of barium and barium alloys.

3,988,076

ROTARY VANE MACHINE WITH SPRING-BIASED VANES

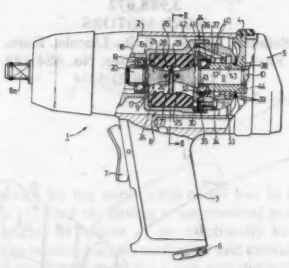
Richard Wolf, Stuttgart, and Kurt Latzina, Waldenbuch, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 17, 1975, Ser. No. 542,014

Claims priority, application Germany, Jan. 30, 1974, 2404317

Int. Cl.² F01C *1/00, 21/00*

U.S. Cl. 418—175 **10 Claims**



1. A portable pneumatic hand tool, comprising a portable housing; a tool chuck mounted on said portable housing; a fluid motor in said portable housing and comprising a rotary outer component having an inner circumferential surface and a stationary inner component having an outer circumferential surface which is eccentrically surrounded by said inner circumferential surface, said outer component being rotatable relative to said inner component and being connected in motion-transmitting relationship with said tool chuck; at least two pairs of guide slots formed in said inner component and

each having an outer end open at said outer circumferential surface and an inner end, the guide slots of each pair being diametrically opposite each other; at least two passages formed in said inner component and each communicating the inner end of one guide slot of a pair with the inner end of the other guide slot of the same pair; a sliding vane in each of said guide slots and having an inner edge face and an outer edge face; and means for mutually supporting the sliding vanes in each pair of guide slots for simultaneous sliding movement in the respective passage, comprising biasing means having opposite ends bearing upon said inner edge faces of the sliding vanes in each pair of guide slots and urging said outer edge faces apart from each other and into engagement with said inner circumferential surface, whereby low stressing of said biasing means is obtained.

3,988,077

PNEUMATIC TIRE VULCANIZING APPARATUS

Alexei Mikhailovich Naratov, ulitsa Rabochaya, 8, kv. 94; Valery Leonidovich Legostaev, ulitsa Rabochaya, 8, kv. 44; Boris Sergeevich Gusev, ulitsa Sovetskaya, 161, kv. 83; Oleg Eduardovich Nadzharov, ulitsa Zhukovskogo, 1, kv. 78, all of Tambov; Valentin Ivanovich Osipov, ulitsa Ustinovicha, 34, kv. 16, Krasnoyarsk; Viktor Vasilievich Anisimov, ulitsa Juzhnaya, 52, Tambov; Enver Osmanovich Muratov, ulitsa Komsomolskaya, 121, Tambov; Ivan Ivanovich Tarasov, ulitsa Krasnoarmeiskaya, 7b, kv. 21, Tambov; Petr Fedorovich Badenkov, Prospekt Mira, 112, kv. 234, Moscow; Ljudvig Mikhailovich Kepersha, 2 ulitsa Sinichkina, 17, kv. 7, Moscow; Valentin Alexandrovich Ionov, Federativny prospekt, 34, korpus 2, kv. 45, Moscow; July Prokofievich Drozdov, shosse Frezer, 7/2 kv. 42, Moscow; Grigory Iosifovich Shvets, ulitsa Metallurgov, 12, korpus 1, kv. 14, Moscow; Ivan Ivanovich Kruglov, ulitsa Sovetskaya, 165, kv. 74, Tambov, and Mikhail Dmitrievich Leontiev, ulitsa Sovetskaya, 180, kv. 1, Tambov, all of U.S.S.R.

Filed Mar. 4, 1975, Ser. No. 555,294

Int. Cl.[2] B29H *5/08*

U.S. Cl. 425—33 **6 Claims**

1. A tire vulcanizing apparatus comprising, a plurality of stationary tire-vulcanizing presses installed in a row, each press having a tire mold having a top mold section having a central opening therein and a bottom mold section, each mold having locking means for releasably locking the top and bottom mold sections relative to each other during a tire-curing period, each press having a well below the bottom mold section for receiving therein a bladder when the tire mold is opened, each tire mold having a bladder secured to the bottom mold section thereof, each top mold section having a clamping mechanism for releasably clamping a top bead of a cured tire in the corresponding tire mold for transporting the cured tire with a corresponding top mold section for removal of the cured tire from the respective tire mold subsequent to curing thereof, a travelling manipulator having means for unloading the cured tires from the presses individually, successively and means for reloading each press with a green tire subsequent to unloading a cured tire therefrom, means comprising a plunger on said manipulator actuatable reciprocably and operable downwardly through the openings in the top mold section of each press to remove the corresponding bladder from a cured tire and introduce it into said well at the end of a curing period, means on said plunger for actuating the clamping mechanisms individually as said plunger travels downwardly through openings of the individual top mold sections thereby to clamp a cured tire to the corresponding top mold section, means on said manipulator for removing the top mold section of each of the tire molds successively, tire-removal means on said manipulator for separating each cured tire from a corresponding top mold section subsequent to removal of the top mold section from a press and means for delivering individually the cured tires to a position for removal therefrom, means on the manipulator for charging a green tire into a bottom mold section of a press after removal of the cured tire therefrom, means on the manipulator to restore the top mold section of a tire mold on to the bottom mold section thereof after charging of a green tire therein, valve means in each press for closing the opening of the corresponding top mold section in preparation for curing a green tire and for opening said opening upon completion of a selected curing period, and means on said manipulator for automatically opening said locking means prior to removal of each top mold section and automatically locking said locking means after each top mold section is restored to a corresponding tire mold.

3,988,078

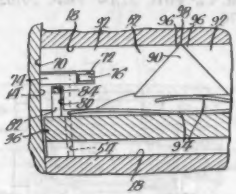
SEALS FOR ROTARY ENGINES

Noble G. Barker, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 23, 1975, Ser. No. 625,224

Int. Cl.[2] F01C *1/02*

U.S. Cl. 418—51 **6 Claims**



1. In a rotary mechanism including a housing defining a chamber including an operating cavity, a shaft journalled in said housing, a rotor having plural apices within said chamber and journalled on said shaft, apex seals carried by said rotor in grooves at each of said apices for sealingly engaging one wall of said chamber, and plural peripheral seals carried by the periphery of the rotor and intersecting the apex seals at the sides thereof for sealingly engaging another wall of said chamber, the improvement comprising: first seals carried by at least one end of each said apex seal and interposed between the adjacent peripheral seals and sealingly engaging said another wall, and second seals carried by each of said apex seals for sealingly engaging a portion of the corresponding groove.

3,988,079

TWO-PIECE ROTOR FOR WANKEL ENGINES

Edwin J. Ounsted, Dearborn; George T. Luzanski, Monroe; Robert W. Gardner, Birmingham, and Thomas E. Crowley, Livonia, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 3, 1974, Ser. No. 511,864

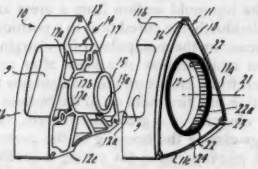
Int. Cl.[2] F01C *1/02*; B23P *15/10*; B23K *1/04*

U.S. Cl. 418—61 A **2 Claims**

1. A rotor assembly for a rotary internal combustion engine, the rotor being adapted to planetate about an axis of the engine, the apparatus comprising:

a. interfitting mating metallic body castings, each comprised of nodular cast iron, each casting having complimentary mating faces which are constituted of at least one radially extending flat surface and of at least one axially extending cylindrical surface, each casting having a wall thickness throughout which is about 0.140 inches, and

b. braze material joining said complimentary mating faces together to provide a rigid diffused metal bond therebetween, said material consisting of a copper alloy consisting essentially of about 60% Cu, 25% Zn, 10% Ni and 5% Sn, which alloy has a liquidus at about 1560°–1570° F and flows at about 1600°–1650° F, which alloy is diffused into both of said mating surfaces.

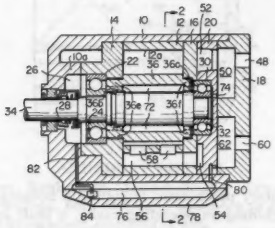


3,988,080

ROTARY VANE COMPRESSOR WITH OUTLET PRESSURE BIASED LUBRICANT

Haruhiko Takada, Kawagoe, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Feb. 18, 1975, Ser. No. 550,791
Claims priority, application Japan, Feb. 20, 1974, 49-19384
Int. Cl.² F01C *21/04*; F04C *29/02*
U.S. Cl. 418—76 **17 Claims**



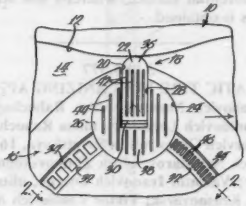
1. In a fluid displacement device having a bored housing, a rotor rotatable in the bore of the housing to define fluid chambers of varying volume, the rotor comprising a rotor shaft journalled in the housing and a hollow rotor tube mounted on the rotor shaft for rotation therewith, the housing being formed with a high pressure passage and a low pressure passage operatively communicating with the fluid chambers in the bore, bearing chambers formed through the housing, bearings mounted in the bearing chambers and supporting the rotor shaft, a lubricant enclosure on said housing, a first passageway formed through a wall of the housing defining the high pressure passage to connect the high pressure passage with the lubricant enclosure, a second passageway formed axially through the rotor, at least part of the second passageway being constituted by a portion of the hollow of the rotor tube, a third passageway connecting the lubricant enclosure with one end of the second passageway of the rotor, part of the third passageway being constituted by one of the bearing chambers, the first and third passageways being constricted, and a fourth passageway connecting the other end of the second passageway of the rotor with the low pressure passage, another bearing chamber comprising part of the fourth passageway, whereby lubricant is forced from the enclosure through the third, second and fourth passageways and the low pressure passage into the bore of the housing to lubricate the rotor and the interior of the housing by the fluid pressure in the high pressure passage acting on the lubricant in the enclosure through the first passageway, discharged from the bore into the high pressure passage with the fluid and returned to the lubricant enclosure through the first passageway.

3,988,081

GROOVED COMPRESSION SEALS FOR ROTARY ENGINES

Alexander Goloff, East Peoria, and George Butler Grim, Washington, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 21, 1975, Ser. No. 551,814
Int. Cl.² F01C *19/00*
U.S. Cl. 418—142 **7 Claims**



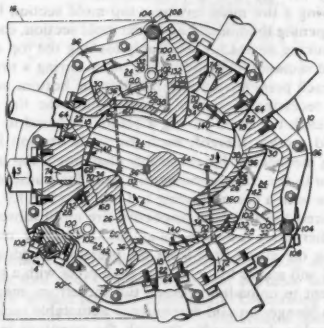
1. In a rotary mechanism including a housing having walls defining a chamber, a rotor within said housing and having surfaces facing said walls, and at least one compression seal having a side exposed to high pressure gases and carried by said rotor, said seal having a seal surface sealingly engaging and slidably contacting one of said walls, the improvement wherein said seal surface is provided with a plurality of grooves each having a substantial dimension extending nonparallel to the direction of sliding contact of said seal surface with said one wall, each said groove terminating short of said side of said seal exposed to high pressure gases, whereby said grooves assist the building of a wear preventing oil film between said seal and said one wall without establishing a leakage path for high pressure gases.

3,988,082

ROTARY STEAM ENGINE

Paul Rogers, 451 SW. Primrose, Portland, Oreg. 97219

Continuation-in-part of Ser. No. 449,031, March 7, 1974, abandoned. This application Jan. 13, 1975, Ser. No. 540,576
Int. Cl.² F01C *1/00*
U.S. Cl. 418—244 **3 Claims**



1. A rotary steam engine comprising:
a. a tubular stationary housing,
b. the inner surface of the housing having the plurality of circumferentially spaced cavities therein,

c. a rotor in said housing having an outer surface rotatable closely adjacent said inner surface of said housing,
d. said outer surface of the rotor having a plurality of circumferentially spaced rotor chammbers therein each registrable with each cavity in the housing during rotation of the rotor,
e. a piston in each cavity movable between a position fully retracted into said cavity and a position projecting radially inward into a registering rotor chamber,
f. timed steam inlet means and steam exhaust means in the housing intermediate adjacent cavities operative respectively to inject steam into and exhaust steam from each rotor chamber during rotation of the rotor,
g. output means connected to said rotor for rotation therewith, and
h. timed piston drive means associated with each piston and operable to move the associated piston inwardly into a registering rotor chamber preliminary to injection of steam under pressure into said rotor chamber ahead of said piston to effect rotation of the rotor, the timed piston drive means including driven means connected to and rotatable with said output means exteriorly of said housing, a lever associated with each piston pivotally mounted intermediate its ends on said housing and having one end thereof disposed for abutting engagement with said piston on the side of the latter opposite the rotor, said lever being pivotally movable between an outer retracted position allowing said piston to retract to its cavity and an inner position moving said piston from its cavity into a registering rotor chamber, and a projection on said driven means arranged to engage the other end of said lever so as to rotate said lever to its position of moving said piston from its cavity into a registering rotor chamber.

3,988,083

NON-CONTACT VANE PUMP

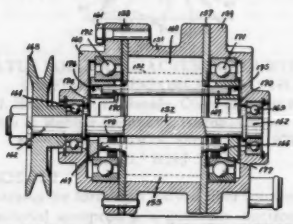
Kenji Shimizu, Ikeda; Junzo Nakaishi, Kawanishi, and Kazuya Yamamoto, Ikeda, all of Japan, assignors to Daihatsu Kogyo Company Limited, Osaka, Japan

Continuation of Ser. No. 282,036, Aug. 21, 1972, abandoned. This application Jan. 30, 1975, Ser. No. 545,398

Claims priority, application Japan, Aug. 28, 1971, 46-66102; July 20, 1972, 47-73266; July 20, 1972, 47-73267; July 20, 1972, 47-73278

Int. Cl.² F04C *17/00*

U.S. Cl. 418—264 **2 Claims**



1. A non-contact type vane pump comprising a pump casing, said pump casing including a casing member, side wall members secured to the opposite open sides of said casing member, side plate members interposed at the upper ends thereof between said side wall members and said casing with the lower ends thereof being inwardly spaced from the side wall members forming an area therebetween, and bolt means securing said side walls members and said side plate members to said casing member in locked, integral relationship, a rotor mounted for eccentric rotation within said casing, radial slots positioned in said rotor in opposed relation to one another, vane means fitted in said radial slots for advancing and retracting movement therein, rolling members projecting from the opposite end sides of said vane means, and rotatable rail members provided on the opposite sides of said casing and interposed in the area between the respective side wall members and side plate members to guide and support said rolling members of said vane means, the rolling members of at least one of said vane means being fixedly connected to a portion of the rotatable rail members whereby upon the rotation of the vane means or the rotor, the rotatable rail members will be rotated directly thereby, the guiding and supporting surfaces of said rotatable rail members having a circular configuration concentric with the inner surface of the casing.

3,988,084

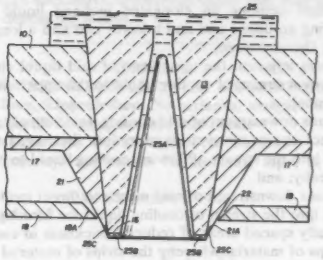
ATOMIZING NOZZLE ASSEMBLY FOR MAKING METAL POWDER AND METHOD OF OPERATING THE SAME

David Esposito, Reading; Raymond A. Reiter, Kehnorst, and Gregory J. Del Corso, West Lawn, all of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.

Filed Nov. 11, 1974, Ser. No. 522,713

Int. Cl.² B22D *23/08*

U.S. Cl. 425—7 **6 Claims**



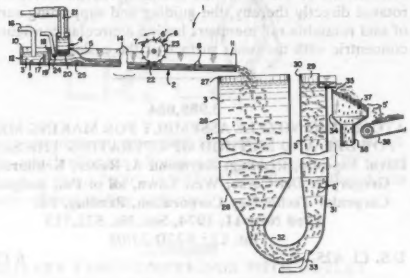
1. Apparatus for atomizing a stream of molten metal, comprising means forming a reservoir for molten metal to be atomized, a metal-transmitting nozzle, means supporting said metal-transmitting nozzle with its intake end extending a predetermined distance into and communicating with said reservoir, said metal-transmitting nozzle having a short metering orifice formed at its intake end and having a length substantially equal to said predetermined distance with the ratio of its length to the diameter of said metering orifice being equal to about 1, said metal-transmitting nozzle having a discharge passage merging at its upper end with said metering orifice, said discharge passage being substantially longer than said metering orifice, said metal-transmitting nozzle at its discharge end terminating in an annular land extending in a plane normal to the axis of said discharge passage and at the end of the latter, the walls defining said discharge passage being downwardly divergent from said metering orifice to said land, means for forming a substantially hollow stream of molten metal at the discharge end of said metal-transmitting nozzle for drawing the molten metal substantially radially outward over said land with part of the metal coating the peripheral portion of said metal-transmitting nozzle from said annular land to the bottom of an annular wall portion and including means forming an annular atomizing fluid orifice surrounding the discharge end portion of said metal-transmitting nozzle with the exit opening of said orifice spaced above said land, and said last mentioned means forming said annular wall portion with the latter separating said atomizing fluid orifice and the discharge end portion of said metal-transmitting nozzle and extending below the exit opening of said atomizing fluid orifice toward said annular land.

3,988,085

APPARATUS FOR FORMING UNIFORM SHAPED PARTICLES OF THERMOPLASTIC MATERIAL

Ludwig C. Krchma, P.O. Box 7101, Kansas City, Mo. 64113

Filed Nov. 24, 1975, Ser. No. 634,823
Int. Cl.² B29C 25/00
U.S. Cl. 425—71 10 Claims



1. Apparatus for reducing molten thermoplastic material to substantially uniform shaped particles and comprising:

a. means defining an elongated inclined liquid channel having an upper end and a lower end and a longitudinal axis therebetween;

b. means adjacent the upper end of said liquid channel to supply a stream of cooling liquid to the upper end of said channel;

c. means downstream of said cooling liquid supply means to direct one or more strips of molten thermoplastic material into the stream of flowing cooling liquid to be cooled thereby; and

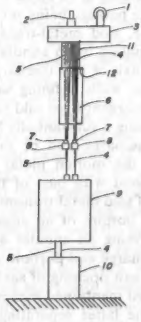
d. means downstream of said means to direct molten material into the stream of cooling liquid for forming longitudinally spaced areas of reduced thickness in each of the strips of material whereby the strips of material separate at the reduced thickness areas upon becoming brittle by cooling.

3,988,086

MELT SPINNING APPARATUS WITH CONVERGENCE GUIDE

Robert Moore Marshall, Chester, and Eugene Addison Swanson, Disputanta, both of Va., assignors to Allied Chemical Corporation, Morris Township, N.J.

Division of Ser. No. 505,183, Sept. 11, 1974. This application May 1, 1975, Ser. No. 573,664
Int. Cl.² D01D 11/04
U.S. Cl. 425—72 S 2 Claims



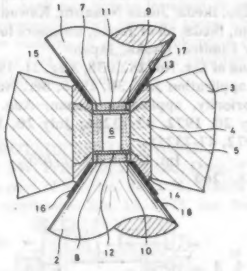
1. In an apparatus for melt spinning a large number of filaments at high speed from a spinneret, wherein said filaments are cooled, converged into a bundle and a protective spinning finish is applied before the filaments are drawn, the improvement comprising a convergence guide having an essentially rectilinear primary yarn-contacting surface of smoothly-rounded contour for converging the filaments into a flat bundle and contiguous yarn-contacting surfaces of smoothly-rounded contour for controlling the width of the yarn bundle, and, in combination therewith, means for distributing a uniform film of lubricant over said primary yarn-contacting surface, wherein said primary yarn-contacting surface and said contiguous yarn-contacting surfaces of the convergence guide form a groove for converging the filaments into a bundle and said primary yarn-contacting surface has a surface of 20 to 200 RMS, and wherein said means for distributing a uniform film of lubricant over said primary yarn contacting surface comprises an inlet for feeding a spinning finish into said convergence guide, said inlet being connected to a conduit for leading the finish upwardly to a slot which feeds the finish onto a downwardly sloping weir, the finish flowing by gravity from said slot downwardly over the downwardly-sloping weir to the primary yarn-contacting surface.

3,988,087

HIGH PRESSURE APPARATUS

Hiroshi Ishizuka, 19-2, Ebara 6-chome, Shinagawa, Tokyo, Japan

Filed Jan. 23, 1976, Ser. No. 651,755
Int. Cl.² B30B 11/32
U.S. Cl. 425—77 4 Claims



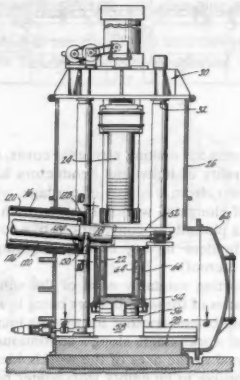
1. A high pressure apparatus which comprises a pair of opposed tapered pistons each having a truncated end surface, a pair of hollow truncated-conical piston protectors each of which is made of a ductile metal and arranged on the tapered piston surface, an annular die member having a substantially cylindrical wall of a diameter larger than that of each piston truncated end surface, a hollow cylindrical body made of less compressibility coefficient material than the die material and having an outer diameter substantially same or slightly smaller than the diameter of said truncated end surface of each piston and positioned coaxially within the die cylindrical wall, and gaskets placed respectively at the ends of said cylindrical body, characterized in that a lubricative layer is formed between the inner surface of each of said piston protectors and the tapered surface of each of said pistons.

3,988,088

PRESS FOR PARTICULATE MATERIAL

Jerry A. King, Palm Beach Gardens; Vernon F. Manz, and Donald G. MacNitt, Jr., both of North Palm Beach, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 4, 1975, Ser. No. 637,624
Int. Cl.² B30B 11/02
U.S. Cl. 425—78 12 Claims



1. A press for compacting particulate material including:
a base plate supporting a container;
a ram movable to compact material in the container, said ram having a head to enter into the container, said ram having an inoperative position with the head above and spaced from the container;
a heating ring adjacent said head when the head is in inoperative position;
a heating coil above the base plate and in a position to surround a container on the base plate, and
a vertically movable carriage on which the heating coil and ring are mounted for vertical movement into inoperative position.

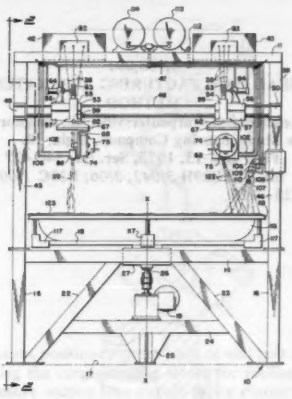
3,988,089

APPARATUS FOR MANUFACTURING CURVED BODIES OF FIBER REINFORCED PLASTIC

William J. Hampshire, Peninsula, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 10, 1975, Ser. No. 611,978
Int. Cl.² B29J 5/00
U.S. Cl. 425—82 17 Claims

1. Apparatus for forming a curved fiber reinforced body of plastic material comprising a generally horizontal support rotatable about a generally vertical axis, a first fiber depositing means mounted at a first position over said rotatable support, a second fiber depositing means mounted at a second position over said rotatable support, said first and second fiber depositing means each including fiber strand cutting means to cut strands of fibers supplied to said fiber depositing means into fibers of predetermined lengths, means to supply a plastic material to coat said cut fibers, drive means to rotate said rotatable support, said first fiber depositing means being positioned to deposit a stream of radial fibers onto said support in directions generally along the radii of curvature of said curved body and said second fiber depositing means being positioned to deposit a stream of circumferential fibers onto said support in directions generally tangential to an arc of said curved body whereby a preform for said body is built up of successive layers of fiber and plastic material as said rotatable support



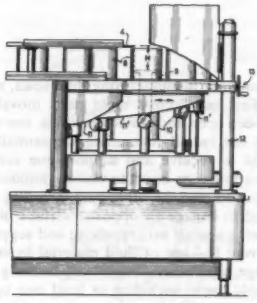
turns through successive revolutions under said first and second fiber depositing means.

3,988,090

FILLING CHEESE MOULDS WITH A CURD PORTION

Geert de Boer, Lippenhuizen, Netherlands, assignor to Stork Amsterdam B.V., Amstelveen, Netherlands

Filed Mar. 31, 1975, Ser. No. 563,393
Claims priority, application Netherlands, Apr. 3, 1974, 7404583
Int. Cl.² A23C 19/02
U.S. Cl. 425—84 5 Claims



1. An apparatus for filling cheese moulds with a curd portion comprising a plurality of vertical, cylindrical sieves having downwardly directed open ends, a table top cooperating with said open ends and having an opening therein, cutter means at an edge of said table opening for passing through and severing a portion of a curd column issuing from a said sieve, a conveyor beneath said table top, a plurality of bottomless cheese moulds on said conveyor which is advanced to advance said moulds synchronously with said sieves, a plurality of vertically movable supporting surfaces in said moulds respectively and movable between fixed upper and lower positions means including an annular cam track underneath said conveyor for periodically moving said supporting surfaces up and down within said moulds, said cam track having a portion thereof to move said supporting surfaces periodically up and down, and means for moving arcuately parallel to the plane of said conveyor advance at least said cam track portion to vary

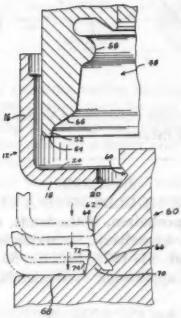
the height of the severed curd portions by changing the phase relationship between said cutter means and said cam track portion.

3,988,091

OIL SEAL MANUFACTURING APPARATUS AND METHOD

Jerry D. Reichenbach, Carpentersville, Ill., assignor to Chicago Rawhide Manufacturing Company, Elgin, Ill.

Filed Jan. 13, 1975, Ser. No. 540,427
Int. Cl.² B29H *3/042, 3/06;* B29C *1/00*
U.S. Cl. 425—125 **4 Claims**



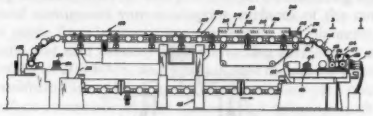
1. An apparatus for manufacturing fluid seals, said apparatus including first and second mold parts movable along a given axis between open and closed positions, one of said parts having at least one radially extending substantially flat mold surface adapted to receive and support one surface of the radial flange portion of an insert to which a molded part of the seal is to be bonded, and the other part including at least one portion adapted to engage an opposite surface of said flange to hold said flange against said receiving and supporting mold surface to prevent leakage of fluid material from said cavity along said flange, a plurality of seal body-forming surfaces on one of said mold parts, including at least one upper frusto-conical surface adapted to form one surface of the primary lip of said seal, a second seal body-forming surface of generally cylindrical form lying beneath said upper surface and joined thereto by a smooth transition portion, a lower frusto-conical surface tapering inwardly and downwardly and defining one surface of a second seal lip spaced axially from said primary lip, and an insert centering ring spaced downwardly apart from said cylindrical surface and radially outwardly of said lower frusto-conical surface, said centering ring having a rounded nose portion slightly greater diameter than the diameter of said cylindrical surface, and a wall surface extending downwardly and outwardly from said nose portion and joined to said flange receiving and supporting surface, the largest diameter of said centering ring being just smaller than the inside diameter of the flange of said insert, whereby said insert, when allowed to fall freely into said mold, is centered by successive contact between its inside diameter and said first tapered surface, said cylindrical surface, and said centering ring wall surface.

3,988,092

APPARATUS FOR MAKING RETRACTILE CORDS

Gordon Foreman Bloxham, Baltimore; Claude Paren Brezeale, Columbia; Eugene Raymond Cocco, Baltimore; Edwin Charles Hardesty, Perry Hall; Byron Lee Small, Baltimore, and Daniel Marion Steinert, Dundalk, all of Md., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 15, 1975, Ser. No. 641,003
Int. Cl.² B29C *17/02*
U.S. Cl. 425—150 **11 Claims**



1. An apparatus for making retractile cords, each of which includes a plurality of individual conductors having a jacket formed thereover, from a supply of cordage, which includes:

a plurality of elongated workholders on each of which may be coiled a plurality of convolutions of a cordage, each of the workholders having cordage-securing facilities at each end thereof;

means supporting rotatably each of the workholders with adjacent ones of the workholders being in spaced parallel relationship to one another for moving incrementally the plurality of workholders along a continuous path substantially normal of the axes of the workholders;

means responsive to an empty workholder being in a cord-loading position for winding a plurality of spaced-apart convolutions of cordage on the workholder;

means responsive to the completion of the winding of the cordage on each successive one of the workholders for causing the moving means to move incrementally the successive ones of the workholders along the path successively through a heating station, a cooling station and a cord-removal station;

means responsive to each successive one of the workholders being advanced into and through the heating station for heating the workholders to facilitate conductive heat transfer into the cord wound thereon and for transferring energy by radiant heat transfer into the outwardly facing portions of the cord wound on each successive one of the workholders; means responsive to each successive one of the workholders being advanced into and through the cooling station for cooling each of the cords wound thereon by convective heat transfer; and

means responsive to successive ones of the workholders being advanced into the removal station for removing each cord from its associated workholder in a manner to reverse the pitch of the helices of the convolutions while minimizing enlargement of the helices and preventing entanglement of each cord prior to removal thereof from the apparatus.

3,988,093

APPARATUS FOR HEAT FORMING A CONTINUOUS WEB OF PLASTIC

William D. Birchenough, 104 E. Genesee St., Skaneateles, N.Y. 13152

Filed Nov. 25, 1974, Ser. No. 526,907
Int. Cl.² B29C *3/02*
U.S. Cl. 425—174.4 **10 Claims**

1. Apparatus for heat forming a continuous web of thermoplastic material in a repeated sequence, said apparatus comprising, in combination:

a. frame means supporting the web for movement in a longitudinal direction and in a horizontal plane;

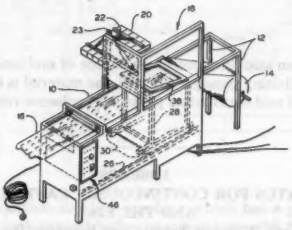
b. heating means arranged to direct downwardly upon a predetermined portion of the web at a fixed station in the

path of web travel, sufficient heat to soften the material to a moldable condition;

c. carriage means mounted upon said frame means for reciprocal linear movement in said longitudinal direction between an initial position at said fixed station, and a terminal position;

d. clamping means associated with said carriage and movable therewith, and further movable relative to said carriage means between a first position wherein marginal portions of the web surrounding said predetermined portion are firmly engaged by said clamping means, and a second position wherein said clamping means is spaced from the web;

e. forming means associated with said carriage and movable therewith, and further movable relative to said carriage



means between a raised position wherein an upwardly facing portion of said forming means is substantially coplanar with said horizontal plane, and a lowered position wherein said upwardly facing portion is spaced downwardly from the said horizontal plane;

f. means for cooperatively moving said carriage, said clamping means and said forming means in a repeated sequence to engage the web at said fixed station, to elevate said forming means to its raised position, to move said carriage means and thereby the web in said longitudinal direction to said terminal position, to release the engagement of the web by said clamping means, to move said forming means to its lowered position, and to move said carriage means back to said initial position; and

g. means fixedly engaging the web during movement of said carriage from said terminal to said initial position.

3,988,094

DENTAL FLASK

George F. McGowan, deceased, late of Kansas City, Mo., by Jennie E. McGowan, heir, 4509 Forest, Kansas City, Mo. 64110

Filed Feb. 24, 1975, Ser. No. 552,710
Int. Cl.² B28B 7/10; A44B 21/00
U.S. Cl. 425—175 **3 Claims**

1. A dental flask comprising:

a substantially tubular primary section having opposed open ends;

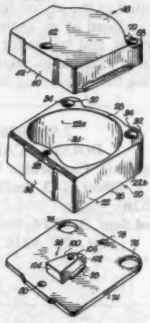
a closure section disposed in covering relationship to one of said open ends;

a lid positioned in covering relationship to the other of said open ends,

said primary section, closure section and lid being cooperatively configured to define at least a pair of spaced, axial bores extending through the lid, the tubular wall defining said primary section, and said closure section;

an elongated internally threaded tubular sleeve removably positioned within each of said bores and having a radial flange in engagement with the face of said lid remote from said primary section;

elongated, threaded bolt means positioned within each of said axial bores with the threaded end thereof received within the corresponding sleeve, the disposition of said bolt means serving to draw said closure section, primary section and lid together;



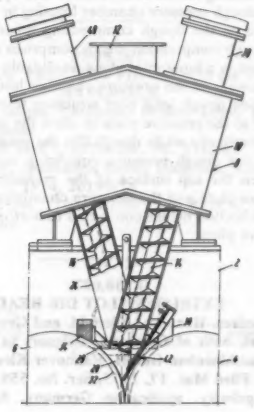
spring means positioned about each of said bolt means and engaging the corresponding sleeve for resiliently urging the closure section into closely fitting contact with said primary section.

3,988,095

ROLL BRIQUETTING PRESS

Peter Mersch; Walter Siepermann, both of Hattingen (Ruhr), and Kurt Zech, Unna, all of Germany, assignors to Koppern & Co. KG, Germany

Filed Jan. 7, 1974, Ser. No. 431,334
Claims priority, application Germany, Jan. 8, 1973, 2300702
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² B29C 3/02, 3/04
U.S. Cl. 425—237 **6 Claims**



1. A roll briquetting press, comprising a housing, a pair of press rolls mounted in said housing and being rotatable in counter rotation relative to each other, a conveyor assembly mounted on said housing and including a filler vessel located vertically above said press rolls for receiving the material to be briquetted therein, a plurality of screw conveyors communicating with said filler vessel and extending downwardly into close adjacent relation to said press rolls and to each other, a filling well located between said press rolls and beneath said conveyors for receiving the briquetting material therein from said conveyors, a plurality of tongue-shaped plates, one of said

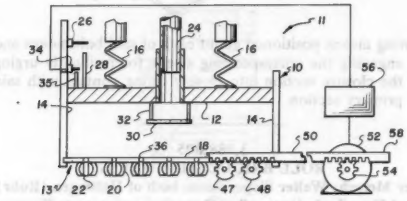
plates positioned below each of said screw conveyors and cooperating therewith to effectively feed said briquetting material to said press rolls, each of said plates extending substantially tangential to the circumference of one of said press rolls and being inclined at an angle of less than 45° with respect to the vertical, and means for individually adjusting the position of each of said plates relative to said conveyors for evenly distributing the briquetting material to said press rolls.

3,988,096

DOUGH SCALER

Gregory C. Papalexis, Cambridge Way, Alpine, N.J. 07620, and Richard I. Elliott, 103 Penfield Ave., Croton-on-Hudson, N.Y. 10520

Filed Sept. 9, 1974, Ser. No. 504,459
Int. Cl.² A21C *5/00*
U.S. Cl. 425—145 **7 Claims**



1. A dough scaler for preshaping and cutting a predetermined amount of dough comprising:
a dough pressure chamber housing having an upper entrance end section and lower exit end section;
dough compressing means slidable engaging said upper end section of the dough pressure chamber housing;
dough sizing means connected to said lower end section of the dough pressure chamber housing; and
position sensing means connected to said upper end section of the dough pressure chamber housing in operable juxtaposition to the dough compressing means and wherein said dough compression means comprises a pressure plate mounted in a horizontal plane an slidable engaging interior sidewalls of the pressure chamber housing;
at least one dough inlet port structure telescopically connected to the pressure plate to allow the pressure plate to move vertically while dough fills the pressure chamber;
at least one dough pressure equalizing means connected between the top surface of the pressure plate and the pressure plate and the pressure chambers housing; and
dough deflection means connected to bottom surface of the pressure plate.

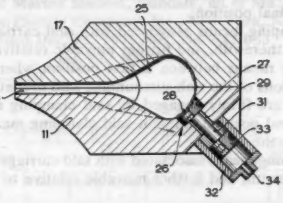
3,988,097

EXTRUDER SLOT DIE HEAD

Dietmar Anders, Hannover-Kleefeld, and Gerd Capelle, Krahenwinkel, both of Germany, assignors to Hermann Berstorff Maschinenbau GmbH, Hannover-Kleefeld, Germany

Filed Mar. 17, 1975, Ser. No. 559,061
Claims priority, application Germany, Mar. 22, 1974, 2413844
Int. Cl.² B29F *3/00*
U.S. Cl. 425—192 R **4 Claims**

1. In an extruder to process plastic materials, a slot die head formed by co-operating upper and lower parts, said upper and lower parts being separable and having inner walls defining a distributing passage, whereby material fed under pressure to said slot die head can be distributed over the width of said distributing passage, said upper and lower parts also defining an outlet slot through which the extruded material can be discharged from said slot die head, and an ejecting piston arranged displaceably in said slot die head, said piston having a crown disposed in a normal position of said piston flush with one of said inner walls of said upper and lower parts which define said distributing passage, and means projecting said



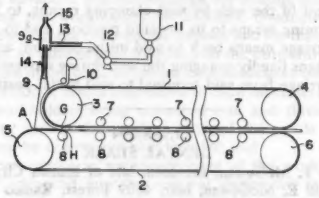
piston from said flush position with one of said inner walls into said distributing passage, whereby the material is lifted off the surface of said distributing passage to enhance removal of the material.

3,988,098

APPARATUS FOR CONTINUOUSLY CASTING A SHEET AND THE LIKE

Tetsuji Kato; Katsumi Tamai; Isao Kamada; Hiroshi Kichiji; Yoshio Nakai; Haruyoshi Kitahara; Yasuhiko Iwaoka; Kiyonori Okajima, and Tadaomi Ueno, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Division of Ser. No. 301,716, Oct. 30, 1972, Pat. No. 3,872,197, which is a continuation of Ser. No. 889,178, Dec. 30, 1969, abandoned. This application Feb. 13, 1974, Ser. No. 438,807
Claims priority, application Japan, Dec. 30, 1968, 43-96655; Apr. 17, 1969, 44-29359
Int. Cl.² B29D *7/14*; B29C *15/00*
U.S. Cl. 425—224 **24 Claims**



1. An apparatus for continuously casting a liquid having a viscosity rendering it flowable under the force of gravity and which hardens with changing temperature and time in a traveling horizontal casting space having casting and discharge ends, said space being defined between two opposed, vertically interspaced, externally restrained, horizontal upper and lower, elongated, flexible belt spans having side seals and traveling in the same direction and formed by endless flexible belts each running around horizontally interspaced cylindrical rolls forming each belt into a loop having semi-cylindrical ends; wherein the improvement comprises a feeder forming a surface declining towards said casting end and free from contact with the surfaces of said belts forming the mutually opposed surfaces of said belt spans between said side seals, said feeder having means for supplying a flow of said liquid to said surface for gravitational flow theredown into said casting end, and means for driving said belts with said belt spans traveling away from said casting end at a speed fast enough to cause said flow to enter said casting space under a hydraulic pressure holding up said upper belt span.

3,988,099

MACHINE BASE WITH HYDRAULIC CONTROLS FOR INJECTION MOLDING MACHINE

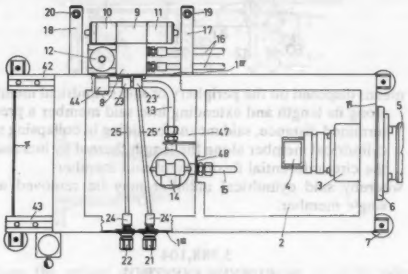
Karl Hehl, Arthur-Hehl-Strasse 32, 7291 Lossburg, Germany

Filed May 28, 1974, Ser. No. 473,690

Claims priority, application Germany, July 23, 1973, 2337276

Int. Cl.² B29F *1/00*

U.S. Cl. 425—242 R 13 Claims



1. In an injection molding machine which has a generally rectangular block-shaped hollow machine base with front and rear longitudinal walls, opposing side walls, and a top mounting surface for supporting thereon a die closing unit, and which has hydraulic control means for operating various, including said die closing unit which opens and closes an injection molding die and one or several injection units, as well as a parts ejector, wherein the improvement comprises, as part of said hydraulic control means, a hydraulic controls arrangement including:

a plurality of hydraulic distributor units with rotatable throttle members, said units being mounted in a vertical succession on the outside of the rear longitudinal wall of the machine base;

a corresponding number of control knobs for said throttle members arranged on the outside of the front longitudinal wall, the control knobs being journalled in said wall; and

means for rotationally linking each control knob to a throttle member across the space between the two longitudinal walls.

3,988,100

APPARATUS FOR INJECTION BLOW MOULDING

Philippe Julien, Sleidinge, Belgium, assignor to Albert Aly Kaufman, North Plainfield, N.J.

Filed Dec. 27, 1974, Ser. No. 536,794

Claims priority, application United Kingdom, Jan. 8, 1974, 917/74

Int. Cl.² B29D *23/03*

U.S. Cl. 425—242 B 9 Claims

1. An apparatus for injection blow moulding, which apparatus includes:

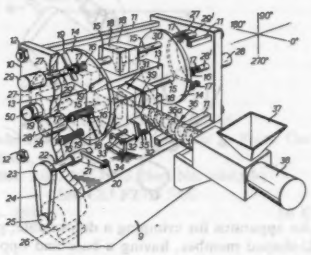
an openable and closable preform mould provided at a first position;

a blow tube and an associated, openable and closable blow mould, the blow tube and associated blow mould being movable together between (a) a first position in which the preform mould is intermediate the blow tube and the open blow mould and (b) a subsequent position where the blow tube and blow mould are clear of the preform mould;

means for moving the blow tube and associated blow mould from the first position to a subsequent position, and then again to the first position, said moving means including means connected to the blow mould;

means for closing the preform mould around the blow tube when the blow tube is in the first position, said preform mould closing means including the blow mould, and means, connected to the preform mould, for subsequently opening the preform mould;

means, in the region of the first position, for injecting molten plastics material into the preform mould when the preform mould is closed in the first position around the blow tube; whereby a preform can be formed in the preform mould;



means for closing the blow mould around the blow tube when the blow mould is in a subsequent position, and for subsequently opening the blow mould, said means for closing and opening the blow mould including means joinable to the blow mould; and

means, coupled to the blow tube, for blowing a fluid medium via the blow tube into the closed blow mould when the blow mould is in a subsequent position, whereby a hollow body can be formed by expansion of the preform.

3,988,101

MACHINES FOR TREATING FILAMENTS OF PLASTICS MATERIALS

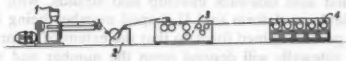
Frank Metcalf Aspin, Barnacre, Bexton Lane, Knutsford, Cheshire, England

Filed May 7, 1975, Ser. No. 575,967

Claims priority, application United Kingdom, May 8, 1974, 20196/74; May 8, 1974, 20199/74

Int. Cl.² B29C *17/00*; B29D *7/00*; B29C *25/00*

U.S. Cl. 425—363 10 Claims



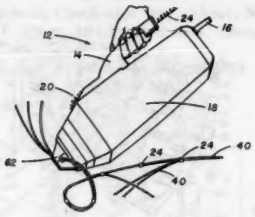
1. Apparatus for the treatment of films of plastics material of the type described comprising a basic unit adapted to receive such film from a supply thereof and deliver it to collection means, and including, in one section, roll means with peripheral annular grooves, and means for facilitating the heating of said roll means, whereby film, having a plurality of parallel longitudinal enlarged portions from which strands are to be produced, may, with the enlarged portions lying in said annular grooves, be progressed and at the same time heated to a temperature suitable for hot-stretching same, and, in an another, following, section, godet rolls whereby the film may be stretched in its passage between the two sections.

3,988,102

CRIMPABLE PLASTIC BUNDLE TIE

Johannes Cornelis Wilhelmus Bakermans, Harrisburg; Ronald Bruce Barnes, Camp Hill, and Richard Anthony Sywulka, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 10, 1975, Ser. No. 630,480
Int. Cl.² B29C *3/00*
U.S. Cl. 425—394 **10 Claims**



1. An apparatus for crimping a deformable, plastic, generally U-shaped member, having a base and oppositely facing sidewalls, about a plurality of individual strands of wire or the like, said apparatus comprising:

a reciprocal anvil movable along a predetermined path from a retracted to a fully extended position, said anvil having a working face,

actuating means for moving said anvil along said predetermined path,

crimping means located along said predetermined path, said crimping means being positioned in the vicinity of the fully extended position of said anvil,

a forward end on said crimping means, said forward end being opposed to said working face of said anvil and comprising at least one concave surface,

an opening on said crimping means between said forward end and said anvil so that said strands can be laced through said opening with the axis of said strands extending transverse to said path traversed by said anvil.

pressure sensitive means on said anvil, said pressure sensitive means preventing travel of said mounting face toward said forward end of said crimping means upon the build up of a predetermined force acting on said working face in the direction opposed to the movement of said anvil,

a loading station, said loading station being located between the retracted and fully extended positions of said anvil, said loading station having loading means for placing one of said U-shaped members between said anvil and said crimping means with said base of said U-shaped member being positioned against said working face, whereby

said U-shaped member is driven toward said crimping means with said sidewalls being deformed by said concave surfaces so that said sidewalls envelop said strands, with the force available to deform said U-shaped member being limited to said predetermined force so that the extent of deformation of said sidewalls will depend upon the number and volume of said strands.

3,988,103

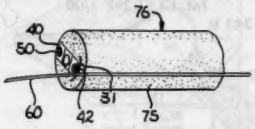
COLLAPSIBLE MANDREL FOR MAKING FIBER TUBES

Alfred C. Hoffmeister, Azusa, Calif., assignor to TRE Corporation, Beverly Hills, Calif.

Filed Mar. 24, 1975, Ser. No. 561,176
Int. Cl.² B29C *13/00*
U.S. Cl. 425—403 **16 Claims**

1. A cylindrically shaped, solid mandrel used in the manufacture of hollow fiber tubes and the like which is partially collapsible along its length comprising:

a substantially rigid cylindrical member having an extraction bar disposed in and along the length thereof, said bar having a length generally corresponding to the length of said cylindrical member and a width extending into said cylindrical member a predetermined distance such that when said bar is extracted from said cylindrical member, said member is rendered pivotally collapsible along the length thereof; and



means disposed on the periphery of said cylindrical member along its length and extending into said member a predetermined distance, said means for aiding in collapsing said cylindrical member along the length thereof by increasing the circumferential flexibility of said member;

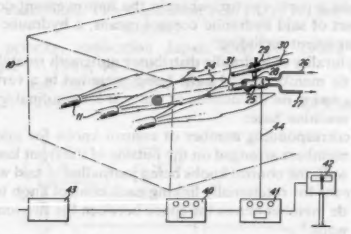
whereby said cylindrical member may be removed as a single member.

3,988,104

BURNER CONTROL

Roy Barber, Sheffield, England, assignor to Land Pyrometers Limited, Sheffield, England

Filed May 7, 1975, Ser. No. 575,173
Claims priority, application United Kingdom, May 23, 1974, 23134/74
Int. Cl.² F23N *5/10*
U.S. Cl. 431—90 **24 Claims**



1. A burner monitor comprising variator means for producing a determined fluctuation of the flow of a reactant to a burner, detector means for detecting radiation from the flame from said burner and for emitting a signal corresponding to the radiation, comparator means coupled to the variator means and said detector means for assessing the polarity of any correlation between said applied fluctuations and said signal from said detector means, and humanly sensible indicator means coupled to said comparator means for indicating said assessed polarity, said variator means producing periodic fluctuations and said comparator being phase-sensitive detector means for producing an output which has a function of the degree of in phase correlation of two input signals.

3,988,105

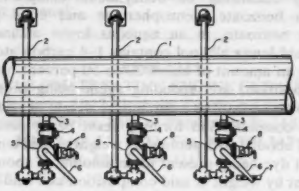
COKE OVEN AIR REGULATING ASSEMBLY

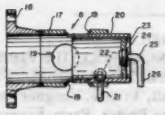
Glenn R. Edwards, 1500 Blossom Hill Road, Pittsburgh, Pa. 15234, and Howard J. Imhoff, 5406 Park Ave., Bethel Park, Pa. 15221

Filed July 7, 1975, Ser. No. 593,478
Int. Cl.² C01B *43/00*
U.S. Cl. 431—121 **4 Claims**

1. In a coke oven battery having a manifold pipe feeding gas to a plurality of three-way valves connected to inlet pipes leading to gas burners of said coke oven battery, an air regu-

lating assembly comprising a pipe connected to each of said three-way valves, said pipe including a plurality of holes, a sleeve longitudinally slidable relative to the free end portion of said pipe so that the inner end of said sleeve selectively





adjusts the extent of opening of said holes so as to admit selective amounts of outside air into said pipe, an end plate closing the outer end of said sleeve, and a handle attached to said end plate to enable manual longitudinal sliding movement of said sleeve relative to said pipe.

3,988,106

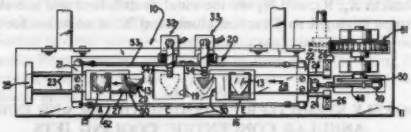
SICKLE BLADE HEATER

Melvin D. Mendelsohn, Chicago, and William G. Klima, Broadview, both of Ill., assignors to Sola Basic Industries, Inc., Milwaukee, Wis.

Filed May 1, 1975, Ser. No. 573,533

Int. Cl.² F24J *3/00*; H05B *5/08*

U.S. Cl. 432—230 **7 Claims**



1. In an apparatus for the transfer of blades to and from a heat-treating station, the combination of a pair of spaced magazines, each containing blades to be heat treated, a pair of heat-treating stations between said magazines, a discharge tube between said heat-treating stations, and means reciprocable between two positions for feeding a blade from a said magazine to a heat-treating station and removing the treated blade from the heat-treating station to discharge the treated blade into said discharge chute, said reciprocable means having means for stripping a blade from a magazine and means for clamping a blade in a heat-treating station.

3,988,107

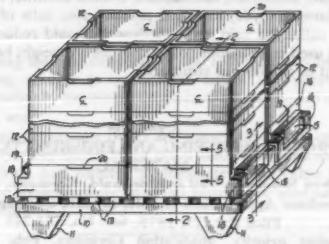
SAGGER CONSTRUCTION

David C. Koch, Zanesville, Ohio, assignor to Ferro Corporation, Cleveland, Ohio

Filed Aug. 12, 1975, Ser. No. 604,001

Int. Cl.² F27D *5/00*

U.S. Cl. 432—258 **10 Claims**



1. Apparatus of the class described including a plurality of bottomless and topless, separable, closed frame members defining sagger means stacked atop each other to form a columnar enclosure substatially free of internal support, one of said frame members adjacent the bottom of said columnar enclosure having exit means mounted on the exterior of said one frame member for reciprocation between closed and open positions.

3,988,108

PROCESS FOR COLORING FIBROUS STRUCTURES

Kenji Segoshi; Toshio Kidogami, both of Osaka, and Chinzo Yamaba, Hirakata, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan

Filed Apr. 9, 1974, Ser. No. 459,444
Claims priority, application Japan, Apr. 9, 1973, 48-40198
Int. Cl.[2] D06P 5/02
U.S. Cl. 8—18 R 19 Claims

1. A process for coloring a fibrous structure consisting essentially of fibers selected from the group of natural fibers, semi-synthetic fibers and synthetic fibers which comprises applying a solution of a coloring agent and a methylol compound derived from formaldehyde, the amount of said methylol compound being about 0.7 to 30% by weight of said solution and being about 1 to 20 times the weight of the coloring agent, to the fibrous structure, heat-treating the fibrous structure at 100° to 220° C for 0.1 to 10 minutes and then treating the fibrous structure with a reducing agent selected from the group consisting of hydrogen, hydrogen iodide, hydrogen sulfide, lithium aluminum hydride, sodium borohydride, carbon monoxide, sulfur dioxide, thiourea dioxide, thiourea sulfite, sodium sulfide, polysodium sulfide, ammonium sulfide, alkali metals, magnesium, calcium, aluminum, zinc, iron (II) salts, tin (II) salts, titanium (III) salts, chromium (II) salts, aldehydes, saccharides, sodium bisulfite, Na-sulfoxylate formaldehyde, modified primary zinc salts of formaldehyde sulfoxylic acid and a hydrosulfite said reducing agents being used in an amount of 0.05 to 5% by weight based on the weight of the fibrous structure.

3,988,109

PROCESS OF DYEING AND FINISHING TEXTILE MATERIAL

Manfred Schuierer, Zell in Odenwald, Germany, assignor to Bruckner Apparatebau GmbH, Erbach, Germany

Filed Feb. 21, 1975, Ser. No. 551,741
Claims priority, application Germany, Feb. 28, 1974, 2409473; July 12, 1974, 2433662
Int. Cl.[2] C09B 67/00; D06P 1/64
U.S. Cl. 8—94 R 18 Claims

1. A process of fixing a dye or finishing substance applied to textile material of synthetic or natural fibres, said process comprising applying to such material an aqueous solution or dispersion of said substance; and subsequently exposing said material to air enriched with halogenated hydrocarbon having a boiling point below 85° C, the exposure to the enriched air occuring at a temperature not exceeding 30° C and prior to drying of said material.

3,988,110

HAIR COLORING AND HAIR-SETTING LOTION CONTAINING A DIRECT DYE, A REDUCING AGENT AND A SOLAR FILTER

Charles Zviak, Franconville, and Giuliana Ghilardi, Paris, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Division of Ser. No. 405,869, Oct. 12, 1973, Pat. No. 3,906,091, which is a continuation-in-part of Ser. No. 100,840, Dec. 22, 1970, abandoned. This application May 20, 1975, Ser. No. 579,050
Claims priority, application Luxemburg, Dec. 24, 1969, 60093
Int. Cl.[2] A61K 7/13
U.S. Cl. 8—10.1 5 Claims

1. A hair coloring and hair-setting lotion composition having a pH of about 5–8.5 for bleached hair or hair dyed with an oxidation dye consisting essentially of a solution of a cosmetic film forming resin having a molecular weight of about 10,000 – 400,000, a reducing agent selected from the group consisting of butyl hydroxy anisole, dodecyl gallate, propyl gallate and octyl gallate, a direct dye and a solar filter selected from the group consisting of benzylidene camphor, glyceryl paraamino benzoate, benzophenone and ethyl paradimethylamino benzoate, in an aqueous lower alkanol solvent wherein said lower alkanol contains 1–4 carbon atoms and is present in an amount of about 20 to 50 percent by weight of said composition, said reducing agent being present in an amount of about 0.02 to 2 percent by weight of said composition, said cosmetic film forming resin being present in an amount of about 1 to 3 percent by weight of said composition, said direct dye being present in an amount of about 0.001 to 0.1 percent by weight of said composition and said solar filter being present in an amount of about 0.03 to 2 percent by weight of said composition.

3,988,111

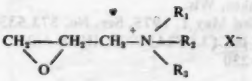
PROCESS FOR THE DYEING OF TEXTILE FIBERS IN AN ORGANIC-SYSTEM MEDIUM

Jean Balland, Chateaurenault, France, assignor to Manufacture de Produits Chimiques Protex, Paris, France

Filed Mar. 17, 1975, Ser. No. 559,151
Claims priority, application France, Mar. 18, 1974, 74.09037
Int. Cl.[2] D06P 5/06
U.S. Cl. 8—172 R 10 Claims

1. A process for dyeing cellulosic fiber, comprising the step of:

treating the fiber with a dye-containing bath having a liquid vehicle consisting predominantly of an organic solvent in the presence of a quaternary ammonium compound having the formula



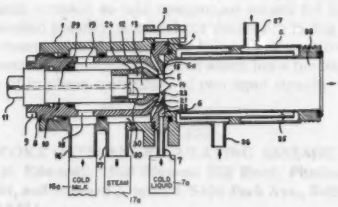
wherein R_1, R_2, and R_3 are identical or different and are alkyl groups having 1 to 3 carbon atoms and X^- is an anion for the quaternary ammonium compound.

3,988,112

NOZZLE STERILIZER PROVIDING OUTER AND INNER ANNULAR CONCENTRIC COOLING JETS

Bjorn-Olow Johansson, Lomma, and Bengt Arne Palm, Genarp, both of Sweden, assignors to Alfa-Laval AB, Tumba, Sweden

Division of Ser. No. 404,622, Oct. 9, 1973, Pat. No. 3,927,974. This application Dec. 6, 1974, Ser. No. 530,418
Int. Cl.[2] A23C 3/02, 3/04; A61L 3/00; B05B 7/12
U.S. Cl. 21—92 4 Claims



1. Apparatus for sterilizing a liquid such as milk, blood or the like, which comprises a jet nozzle having body means forming four annular concentric channels, namely, an innermost channel, an outermost channel and two intermediate channels intermediate said innermost and outermost channels,

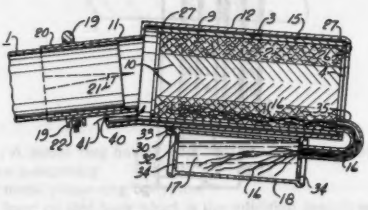
a central plug around the outside of which said four channels open, whereby said channel openings surround the central plug a source of steam and a source of liquid to be sterilized connected, respectively, to the two intermediate channels, and means for supplying cold liquid to said innermost and outermost channels.

3,988,113

APPARATUS FOR TREATING ENGINE EXHAUST GASES

Arnold L. Roberts, 6942 Blenheim Court, and Stuart Adelkoff, 108 Hartwood Drive, both of Pittsburgh, Pa. 15208

Filed Aug. 17, 1973, Ser. No. 389,347
Int. Cl.² F01N *3/15, 3/16*
U.S. Cl. 23—252 R **11 Claims**



1. An apparatus for purifying engine exhaust gases comprising, an engine exhaust pipe system, an engine exhaust gas purifying tube having a chamber serially connected in said engine exhaust pipe system and having access means for the insertion and removal of a filter cartridge radially mating the walls of said chamber, a disposable filter cartridge in said chamber and radially mating the walls thereof, said cartridge including filter means consisting of asbestos material in the form of a woven tubular fibrous asbestos filter member with a center core of loosely spaced fibrous filter strands freely extending substantially radially inwardly from said tubular member for the passage of exhaust gases therethrough, said fibrous filter member and strands in said cartridge being impregnated with a desired liquid chemical for purifying said exhaust gases.

3,988,114

AGGLOMERATING FINELY DIVIDED AGGLOMERATIVE MATERIALS IN A ROTATING DRUM WITH CO-ROTATING SCRAPER

Everett Gorin, Pittsburgh; William A. Jasulaitis, Bridgeville; George E. Wasson, and Frank William Theodore, both of Pittsburgh, all of Pa., assignors to Consolidation Coal Company, Pittsburgh, Pa.

Continuation of Ser. No. 466,832, May 3, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,687
Int. Cl.² B01J *2/12;* **C01B** *31/14*
U.S. Cl. 23—313 R **5 Claims**

1. A method for agglomerating finely divided agglomerative material comprising,

feeding finely divided agglomerative material into a substantially horizontal rotating drum having an inner wall, said drum having a longitudinal axis and said drum arranged to rotate about said longitudinal axis,

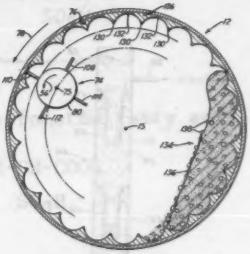
depositing a layer of said finely divided agglomerative material on said drum inner wall,

rotating a longitudinally extending scraper in said drum in the same direction of rotation as said drum in fixed timed relation to the rotation of said drum to form a preselected number of longitudinally extending ridges according to the following formula:

$$N = \frac{b\,U_2}{U_1}$$

N = a whole number and number of ridges formed
b = number of scraper blades
U_1 = drum speed, rpm
U_2 = scraper speed, rpm,

forming a plurality of elongated alternating and longitudinally extending ridges and valleys in said layer, said ridges and valleys extending substantially lengthwise along said drum inner wall and substantially parallel to said drum longitudinal axis,



controlling the ratio of speeds of said rotating drum and said rotating scraper to control the height and number of longitudinally extending ridges and valleys formed in said layer, and

maintaining said same ridges and same valleys so formed in said layer deposited on the drum inner wall while rotating said drum and forming agglomerates from other finely divided agglomerative material introduced into said rotary drum.

3,988,115

DIAGNOSTIC METHOD FOR DETERMINING PATHOLOGICAL CONDITION BY ANTIGEN-COMBINING CAPACITY OF LYMPHOCYTES

Farrokh Z. Modabber, P.O. Box 1310, School of Public Health, Teheran University, Teheran, Iran

Filed Sept. 18, 1975, Ser. No. 614,360
Int. Cl.² G01N *33/16*
U.S. Cl. 23—230 B **14 Claims**

1. A method for determining in a patient the presence or absence of a pathological condition which produces at least one specific immune response which comprises:

a. extracting from the patient a sample of blood,

b. providing a control sample containing particles of predetermined binding activity with respect to an antigen associated with said pathological condition,

c. adding to at least the lymphocyte fraction of said patient's blood and of said control sample an excess of a detection agent comprising an antigen for said pathological condition linked to a marker material whereby a portion of said detection agent attaches to a portion of the lymphocytes in said lymphocyte fraction,

d. eliminating from each of said lymphocyte fractions any unattached detection agent,

e. determining the amount of attached detection agent in each of said lymphocyte fractions through determination of the amount of said marker material therein and calculating the amount of attached detection agent in each of said lymphocyte fractions per designated number of white blood cells, and

f. comparing the amount of said marker material per designated number of white blood cells in said blood of said patient with the amount of said marker material per

designated number of white blood cells in the blood of said control sample.

3,988,116

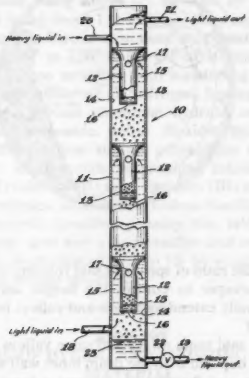
APPARATUS FOR COUNTERCURRENT LIQUID-LIQUID EXTRACTION

Lanny A. Robbins, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 27, 1975, Ser. No. 553,714

Int. Cl.² B01D *11/04*

U.S. Cl. 23—270.5 T **3 Claims**



1. An apparatus useful for liquid extraction, which includes the combination of:

a vertical cylindrical column which has an upper end, a lower end, and an inner wall surface,

a series of tubular members, each tubular member being positioned within the column, each tubular member having an outer wall surface of smaller diameter than the inner wall surface diameter of the column, with an annular space being defined between the outer wall surface of each tubular member and the inner wall surface of the column, each tubular member having a top end with an opening therein and a bottom end with at least one opening therein, each tubular member being sealed to the inner wall surface of the column at the periphery of the top end, and each tubular member having at least one side opening in the outer wall surface of the tubular member;

the column including a lower liquid inlet and a lower liquid outlet, the said inlet and outlet being positioned near the bottom end of the column;

the column including an upper liquid inlet and an upper liquid outlet, the said inlet and outlet being positioned near the top end of the column;

the apparatus being adapted for receiving a first liquid into the column through the lower inlet, carrying the first liquid upwardly in the column through the annular space and through the side opening of each tubular member, and carrying the first liquid out of the column through the upper outlet; and

the apparatus being further adapted for receiving a second liquid into the column through the upper inlet, carrying the second liquid downwardly in the column through the top and bottom openings of each tubular member, and carrying the second liquid out of the column through the lower outlet.

3,988,117

REACTOR FOR THE PRODUCTION OF OXYGEN CONTAINING COMPOUNDS

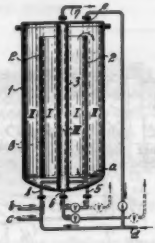
Friedrich Schnur; Josef Hibbel, both of Oberhausen, and Boy Cornils, Dinslaken, all of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

Division of Ser. No. 424,988, Dec. 14, 1973, Pat. No. 3,929,900. This application June 18, 1975, Ser. No. 588,082

Claims priority, application Germany, Dec. 27, 1972, 2263498

Int. Cl.² B01J *8/08*; C07C *45/10*

U.S. Cl. 23—285 **3 Claims**



1. A reactor for performing the Oxo-process which comprises a first generally cylindrical wall defining therewithin a first chamber, said first generally cylindrical wall having disposed thereabout an exterior housing to define a second chamber between a wall of said exterior housing and said first generally cylindrical wall, said exterior housing comprising side walls, a top wall, a bottom wall, inlet and outlet means, said first generally cylindrical wall being spaced from the walls of said housing to define an upper region above said first and second chambers and a lower region beneath said first and second chambers, said first and second chambers being in fluid communication with one another above and below said first cylindrical wall through said upper and lower regions, said first chamber having disposed therethrough a tabular conduit that interconnects with and is closed by the top and bottom walls of said reactor, said tubular conduit, top and bottom walls forming a third chamber therebetween and having inlet and outlet means at opposite ends thereof and conduit means connecting and communicating the outlet means of said housing with the inlet means of said third chamber and said housing.

3,988,118

TUNGSTEN-NICKEL-IRON-MOLYBDENUM ALLOYS

Robert Grierson, Kokomo, Ind., and Earl I. Larsen, Sarasota, Fla., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation of Ser. No. 362,195, May 21, 1973, abandoned, which is a continuation of Ser. No. 125,691, March 18, 1971, abandoned. This application Mar. 10, 1975, Ser. No. 556,607

Int. Cl.² C22C *1/04, 27/04*; B22C *1/00*; B28B *7/34*

U.S. Cl. 29—182 **10 Claims**

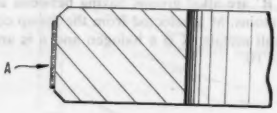
1. A sintered W based alloy consisting essentially of about 55 to about 98 wt.% W, about 0.5 to about 12 wt.% Ni, about 0.5 to about 8 wt.% Fe, the ratio of Ni to Fe is from about 1:1 to about 4:1, about 0.5 to about 25 wt.% Mo, and about 0.01 each to about 15 wt.% total of a property improving element selected from the group of V, Ta, Zr, Mn, Ti, Y, Re, B, Si and mixtures thereof.

3,988,119

PISTON RING

Kentaro Takahashi, Ohmiya, and Yoshikatsu Nakamura, Yokohama, both of Japan, assignors to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 332,446, Feb. 14, 1973, abandoned. This application Jan. 2, 1975, Ser. No. 538,215
Claims priority, application Japan, Feb. 14, 1972, 47-14829
Int. Cl.[2] B32B *15/18*
U.S. Cl. 29—195 6 Claims



1. A piston ring having improved abrasion and scuff resistance comprising:
a metal piston ring body, and
a layer on said body which is the solidified deposit resulting from the simultaneous application onto a wear surface of said piston ring body of molten molybdenum and molten iron alloy wherein said molybdenum and said iron alloy are applied in approximately equal amounts,
said iron alloy being selected so that the said layer exhibits a hardness value of at least about HRC 25,
said layer consisting of a mixture of particles of said iron alloy, an alloy of said iron alloy and molybdenum, and molybdenum, surface portions of said layer being oxidized to iron oxide and molybdenum oxide, and said layer further containing voids.

4. A piston ring having improved abrasion and scuff resistance comprising:
a metal piston ring body, and
a layer on said body which is the solidified deposit resulting from the simultaneous application onto a wear surface of said piston ring body of molten molybdenum and molten iron alloy wherein said molten molybdenum is present in an amount of about 80% and said iron alloy in an amount of about 20%,
said iron alloy being selected so that the layer exhibits a hardness value of at least about HRC 25,
said layer consisting of a mixture of particles of said iron alloy, an alloy of said iron alloy and molybdenum, and molybdenum, surface portions of said layer being oxidized to iron oxide and molybdenum oxide and said layer further containing voids.

3,988,120

METHOD OF DESULFURIZING COAL

Tung-Yu Chia, 32-50, 70th St., Apt. 5J, East Elmhurst, N.Y. 11370

Filed Nov. 26, 1974, Ser. No. 527,442
Claims priority, application Japan, May 9, 1974, 49-50778
Int. Cl.[2] C10L *9/10;* C10B *57/08*
U.S. Cl. 44—1 R 7 Claims

1. A method of desulfurizing coal which comprises immersing powdered coal in an aqueous solution of a polar compound containing a nonpolar group bonded to a polar group and then washing the immersed coal, followed by drying said coal; said polar compound being selected from the group consisting of

(a) alkyl sulfate

$$R\text{-}SO_3M$$

(b) alkyl sulfonate

i) $R\text{-}SO_3M$
ii) $R\text{-}CH(SO_3M)\text{-}R$

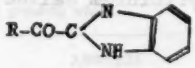
(c) α-sulfonated fatty acid

$$R\text{-}CH(SO_3H)\text{-}COOH$$

(d) dialkyl succinate

$$R\text{-}O\cdot OC\text{-}CH_2\text{-}CH(SO_3M)\text{-}COOR$$

(e) fatty acid benzimidazoline



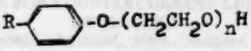
(f) succinic amide alkyl ester sulfonate

$$MO_3S\text{-}CH(CH_2\text{-}COOM)\text{-}CONH\text{-}R$$

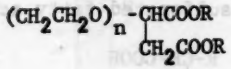
(g) polyoxyethylene alkyl ether

$$R\text{-}O\text{-}(CH_2CH_2O)_nH$$

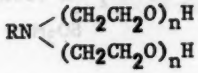
(h) polyoxyethylene alkylphenol ether



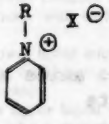
(i) polyoxyethylene polyol fatty ester



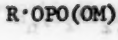
(j) polyoxyethylene alkylamine



(k) alkylpyridinium halide



(l) alkyl phosphate



(m) alkylaryl phosphate

wherein R and R′ are alkyl groups having between about 10 and 20 carbon atoms, M is selected from the group consisting of NH_4 and alkali metals, X is a halogen and *n* is an integer from 1 to about 10.

3,988,121

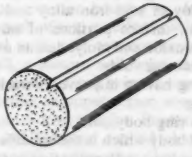
FIRE KINDLER

Newton George Leveskis, Auburn, Calif., assignor to Custom Research and Development, Inc., Auburn, Calif.

Continuation-in-part of Ser. No. 443,565, Feb. 19, 1974, abandoned. This application Jan. 9, 1976, Ser. No. 647,948

Int. Cl.² C10L *11/00, 5/02*

U.S. Cl. 44—41 **10 Claims**



8. A fire kindling tablet comprising a major amount of a wax-cellulosic powder composition, wherein said cellulosic powder is present in from about 40 to 80 weight percent and having on its surface from about 0.05 to 0.5 weight percent of said tablet of a peroxide-cellulosic powder composition comprised of a diacyl peroxide of at least 20 carbon atoms combined with a cellulosic powder, said diacyl peroxide being present in from 25 to 90 weight percent of said peroxide-cellulosic powder composition, wherein said wax has a melting point in the range of about 115° to 200° F.

9. A fire kindling tablet in accordance with claim 8, wherein said cellulosic powder is formed from a member selected from the group consisting of wood, leaves, straw, nuthulls and rice hulls.

3,988,122

MOTOR FUEL COMPOSITION

Joel W. Rosenthal, El Cerrito, and Robert H. Kozlowski, Berkeley, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

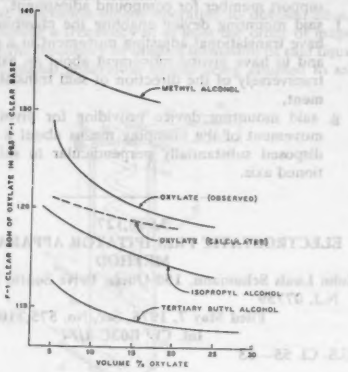
Continuation-in-part of Ser. No. 163,517, June 25, 1971, abandoned. This application June 30, 1975, Ser. No. 591,344

Int. Cl.² C10L *1/02*

U.S. Cl. 44—56 **4 Claims**

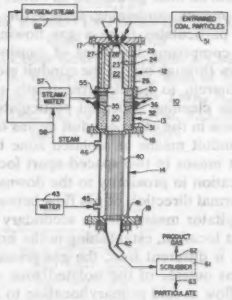
1. A lead free motor fuel comprising 85–96 volume percent gasoline-boiling-range hydrocarbons and 4 to 15 volume per-

cent of an oxylate which comprises a mixture of alcohols, said mixture containing about 40–60 volume percent tertiary butyl



alcohol, about 20–30 volume percent isopropyl alcohol, and about 20–30 volume percent methyl alcohol.

3,988,123
GASIFICATION OF CARBONACEOUS SOLIDS
Ralph L. Coates, Provo, Utah, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D. C.
Filed Aug. 15, 1975, Ser. No. 605,369
Int. Cl.² C10J *3/20, 3/06*
U.S. Cl. 48—73 **8 Claims**



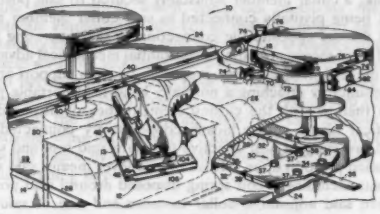
1. A process for converting carbonaceous solids to an intermediate heating value fuel gas or synthesis gas comprising:

a. Mixing small particles of said carbonaceous solid with oxygen and a reaction moderator by injecting streams of said particles, oxygen and moderator under selected temperature and pressure into a combustion stage at the top of a downflow gasifier having three fastened together stages to cause partial combustion and reaction of said particles;

b. Passing the products of step a. directly into the second stage which is a quench stage axially aligned with but of larger inner diameter than said combustion stage and subjecting said products of step a. to a stream of water injected into said quench stage at a temperature low enough to cause solidification of ash and slag into small particles but high enough to permit later recovery of sensible heat; and

c. Passing the gaseous product with entrained particles of ash and slag of step b. directly into a heat recovery stage and recovering sensible heat from said products of step (b).

3,988,124
SKATE SHARPENING MACHINE
Roger M. Babcock, 18 Bancroft Ave., Wakefield, Mass. 01880
Filed June 26, 1975, Ser. No. 590,636
Int. Cl.² B24B *19/26, 41/06*
U.S. Cl. 51—96 **12 Claims**



1. In a mchining apparatus for forming a contoured surface by carrying an article to be contoured across the face of an abrasive grinding wheel in a predetermined path, the improvement wherein said apparatus comprises

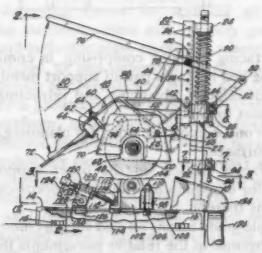
a. clamp means for mounting said article in a predetermined attitude relative to said grinding tool;

b. carrier means for said clamp, said carrier means pivotally attached to said clamp and adapted to move said clamp through a predetermined accurate path relative to said grinding tool;

c. said carrier means comprising two elongate parallel arms each adapted for pivotal attachment to said clamp and each arm (1) pivotally attached to said apparatus at an end thereof remote from said clamp, and (2) pivotally and slideably supported at an end thereof proximate said clamp, said elongate arms so attached to said apparatus and said clamp to be parallel during pivotal movement thereof;

d. and arm-length-adjusting means proximate the end of said arms remote from said clamp forming means to change the length of both arms and, consequently, the effective length of said parallel arms, and the effective path of said clamp means, as said arms move in parallel in response to the clamp means being moved across the face of said grinding wheel.

3,988,125
POWER SAW HOLDER
John R. Ulsh, Box 143, Summit Station, Pa. 17979
Filed Feb. 14, 1975, Ser. No. 549,856
Int. Cl.² B24B *19/00*
U.S. Cl. 51—98 R **6 Claims**



1. A power saw holder comprising a base, a horizontal table surface on said base for supporting material to be cut, a sup-

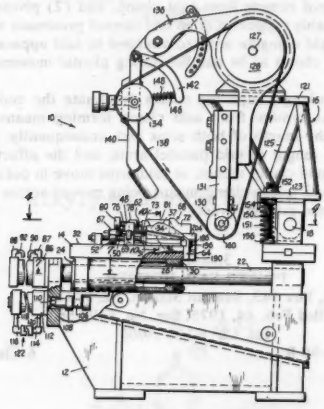
port post extending vertically from said base, a saw support arm mounted for vertical sliding movement in a predetermined plane on said support post, said saw support arm being adjustably connected to a vertically disposed channel member, said channel member having vertically spaced slide elements extending therefrom, said slide elements being apertured to receive said support post in slidable relation, lever means for selectively lowering and raising said saw support arm with respect to said base, said lever means including an operating lever pivotally connected to said channel member and having one end thereof pivotally connected to one end of a link, a collar member adjustably secured to said post, said link being pivotally connected to said collar member at the end thereof opposite the connection to said operating lever, said lever means providing a substantial mechanical advantage for movement of said arm, means on said saw support arm for demountably attaching a normally hand-held portable power saw thereto with the cutting element thereof disposed in a vertical plane, spring means cooperatively connected with said saw support arm effective to return said arm and saw to a raised position upon release of said lever means, said spring means including a coil spring disposed around said post between said adjustable collar member and one of said slide elements, said adjustable collar member cooperating with one of said slide elements to limit the upward movement of said saw support arm, and means on said base for selectively clamping a work piece for engagement by the power saw cutting element upon downward movement thereof.

3,988,126

MACHINE FOR RESURFACING TURBINE VANES

Ralph T. DeMusis, 547 Foxon Road, North Branford, Conn. 06471

Filed Dec. 2, 1974, Ser. No. 528,839
Int. Cl.² B24B *17/02, 19/14*
U.S. Cl. 51—100 R **11 Claims**



11. A resurfacing machine comprising, in combination:

a. a machine bed having a pair of support members thereon, capable of relative advancing and retracting movement with respect to each other,

b. means on one support member, for clamping a workpiece to be resurfaced,

c. a resurfacing device on the other support member, adapted for engagement with said workpiece to perform operations thereon,

d. cooperable guide means on said support members, operative in response to the relative movements therebetween, for effecting relative movement between the workpiece and resurfacing device in directions different from the support member movements whereby contoured portions of the workpiece can be resurfaced as the support members change their relative positions, and

e. a mounting device, carrying said clamping means on the support member for compound adjustment,

f. said mounting device enabling the clamping means to have translational adjusting movement in a given plane, and to have pivotal movement about an axis extending transversely of the direction of said translational movement,

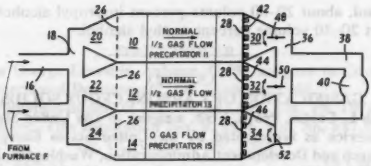
g. said mounting device providing for pivotal adjusting movement of the clamping means about a second axis disposed substantially perpendicular to said first-mentioned axis.

3,988,127

ELECTROSTATIC PRECIPITATOR APPARATUS AND METHOD

John Louis Schumann, 150 Queen Drive South, Little Silver, N.J. 07739

Filed May 7, 1975, Ser. No. 575,210
Int. Cl.² B03C *3/74*
U.S. Cl. 55—13 **16 Claims**



1. A method of operating an electrostatic precipitator which has at least two separate conduit means for conducting gas to be cleaned from an inlet plenum to an outlet plenum, each of said conduit means containing means for electrostatically precipitating particulates from a gas flowing therethrough, said method comprising the steps of causing the gas to be cleaned to flow through one of the conduit means and causing particulates therein to be electrostatically precipitated and collected while cleaning collected particulates from the precipitating means in the other conduit means by establishing in said other conduit means an isolated zone by blocking said other conduit means in two spaced-apart locations including a primary location in proximity to the downstream end, relative to the normal direction of gas flow between the plenums, of said precipitator means, and a secondary location spaced from said first location, establishing in the isolated zone a gas pressure that is different from the gas pressure in said other conduit means outside of the isolated zone such as to cause any leakage flow at said primary location to be in a direction reversed from the direction of normal gas flow through said conduit means, rapping the precipitator means in said other conduit means while the gas flow through said first conduit means is blocked and while the reversed leakage flow is maintained, cleaning the gas in said other conduit means of reentrained particulates after rapping has stopped and while the gas flow therein is blocked and said reversed leakage flow is maintained, and unblocking said other conduit means to reestablish gas flow through and precipitation in said other conduit means.

3,988,128

ELECTRIC PARTICLE PRECIPITATOR

Walter R. Hogg, Miami Lakes, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.

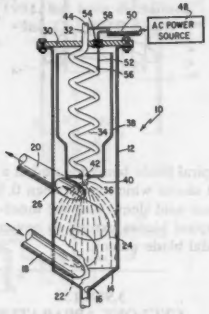
Filed May 21, 1974, Ser. No. 468,981
Int. Cl.² B03C *3/16*
U.S. Cl. 55—10 **16 Claims**

1. A particle precipitator for removing particulate matter suspended in a gaseous medium including in combination,

a housing having a chamber therein for passage of said gaseous medium therethrough,

means for injecting a liquid into said chamber to successively form droplets therein,

a.c. signal generation means operative to develop an a.c. signal having a frequency of at least the order of magnitude of the frequency of droplet formation of said liquid, said a.c. signal generation means being coupled to said

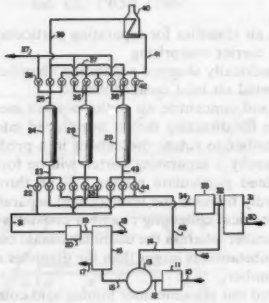


injecting means for imposing a substantially fixed charge on each of said successively formed droplets in response to said a.c. signal forming successively charged droplets, the said successively charged droplets having different charge magnitudes and polarities and thereafter being operative to develop a nonuniform electric field within said chamber sufficient to capture said particles and remove same from said gaseous medium concurrently with the movement of the droplets through said chamber.

3,988,129
PROCESS FOR REMOVING SULFUR DIOXIDE FROM GAS STREAMS

Louis L. Fornoff, Cedar Grove, N.J.; John J. Collins, Katonah, and Raymond A. Reber, Montrose, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 16, 1974, Ser. No. 533,350
Int. Cl.² B01D *53/04*
U.S. Cl. 55—33 1 Claim



1. In the process for removing sulfur dioxide from a gas stream comprising sulfur dioxide, water, nitrogen and oxygen wherein said gas stream is treated in adsorption system comprising at least three fixed beds of activated crystalline zeolitic molecular sieve adsorbent, each of said three fixed beds cyclically undergoing the sequential steps of

a. adsorption, whereby the said gas stream is passed thereinto at a temperature of from 10° to 50° C. and sulfur dioxide and water are selectively adsorbed therein.

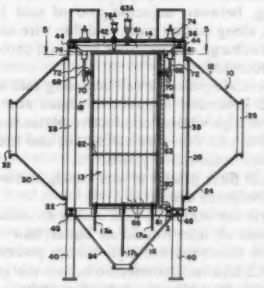
b. desorption wherein air containing less than 5 ppm water vapor by volume and at a temperature of from 150° to 350° C. is passed as a purge gas countercurrently therethrough to desorb sulfur dioxide and water and flush same from the bed,

c. cooldown wherein an air stream at a temperature of from 0° to 60° C. and containing less than 200 ppm water vapor is passed cocurrently, with respect to the direction of flow during the adsorption step, through said bed, the cyclic operation of the beds in the system being such that at some given time each of the said three beds in undergoing a different one of the said steps than the other two beds the improvement which comprises preparing the air stream employed in step (c) by passing ambient air containing more than 200 ppm water vapor through a sulfuric acid scrubber to reduce the water vapor content thereof to between 10 and 200 ppm by volume and using the effluent air stream from the bed undergoing step (c) to desorb the bed undergoing step (b), said effluent air stream being dehydrated to contain not more than 5 ppm water vapor by volume by passage through the said bed undergoing step (c).

3,988,130
ELECTROSTATIC PRECIPITATOR WITH RAPPER AND PNEUMATIC FLOW BLOCKING

James R. Ramsey; Terence D. Baier, both of La Crosse, Wis., and William B. Swim, Cookeville, Tenn., assignors to The Trane Company, La Crosse, Wis.

Filed Sept. 24, 1975, Ser. No. 616,273
Int. Cl.² B03C *3/76*
U.S. Cl. 55—112 20 Claims



18. An electrostatic precipitator apparatus comprising a plurality of collector plate electrodes; means for passing a primary gaseous stream containing particles over said collector plate electrodes; means for applying an electrostatic charge to the particles within said primary gaseous stream relative to said collector plate electrodes whereby said particles are attracted to and deposited on said collector plate electrodes; means for periodically jarring said collector plate electrodes for a predetermined period for cleaning collected particles therefrom; a fluid conduit operatively associated with said collector plate electrodes; orifice means associated with said conduit for discharging a secondary gas from said conduit in a direction so as to repulse the flow of primary gas over said collector plate electrodes; means for periodically pressurizing said fluid conduit for a predetermined period; said predetermined period for pressurizing the fluid conduit associated with one of said collector plate electrodes coinciding with the predetermined period of jarring said one collector plate electrode.

3,988,131
ELECTRONIC AIR CLEANER

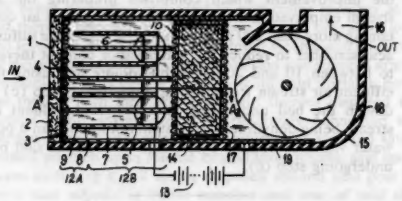
Hikaru Kanazawa, Tokyo, and Katsuyuki Takenoshita, Fussa, both of Japan, assignors to Alpha Denshi Kabushiki Kaisha and Hitachi Jidoshabuhinhanbai Kabushiki Kaisha, both of, Japan

Filed Nov. 14, 1975, Ser. No. 632,078

Claims priority, application Japan, July 9, 1975, 50-95505[U]

Int. Cl.² B03C 3/01

U.S. Cl. 55—126 **10 Claims**



1. An electronic air cleaner, comprising:

a casing of insulating material having an air inlet and an air outlet;

a mechanical pre-filter placed in said casing at the air inlet;

a grounded conductive protection net located in said casing behind said mechanical pre-filter;

a plurality of thin-wire electrodes less than 50 microns in diameter arranged in appropriate intervals at substantial rectangles with an air path from the air inlet to the air outlet;

a plurality of grounded conductive plates each having one end attached to said protection net and backwardly extending, between adjacent two of said thin-wire electrodes, along said air path, said thin wire electrodes forming a discharge cell together with said protection net and said grounded plates;

an electrostatic collector cell including said extending parts of said grounded conductive plates and a plurality of negative high voltage conductive plates respectively connected to said thin-wire electrodes and laid between said grounded conductive plates;

a chemical filter placed in said casing behind said electrostatic collector cell;

an electric fan seated in said casing to cause a flow of air from said air inlet to said air outlet; and

a negative direct-current high voltage power source of less than 4.2 kilo-volts connected across the ground and said high negative voltage conductive plates.

3,988,132
DEVICE FOR SEPARATING IMPURITIES FROM GASES

Leendert Oranje, Haren, Netherlands, assignor to Stamicarbon B.V., Geleen, Netherlands

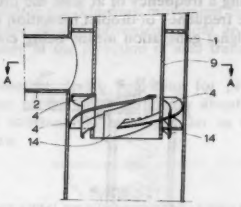
Filed Feb. 20, 1975, Ser. No. 551,293

Claims priority, application Netherlands, Mar. 19, 1974, 7403639

Int. Cl.² B01D 45/12

U.S. Cl. 55—399 **1 Claim**

1. Device for separating particles from a gas stream which consists essentially of a cylindrical vessel having a feed pipe connected thereto; an axial discharge pipe connected to and protruding into said vessel, a sleeve located in said vessel around said discharge pipe and spaced therefrom and having fixed thereto helicoidal impeller blade means for causing the gas feed to rotate; a guide plate extending between said sleeve and the inner surface of said vessel and positioned adjacent said feed pipe so as to guide the feed toward said helicoidal blade means; means located within said vessel and below said blade means to discharge said particles; said device further having a plurality of spiral impeller blades extending perpendicularly below and above, and being fixed to, aid helicoidal impeller blade means, such that one vertical edge of each of said spiral blades touches said sleeve along, essentially, a straight vertical line, the other, essentially straight, vertical



edge of each spiral blade being located at a distance from the surface of said sleeve which is between 0.33 and 0.90 of the distance between said sleeve and the inner wall of said vessel and that said spiral blades extend to beyond the lower edges of said helicoidal blade means.

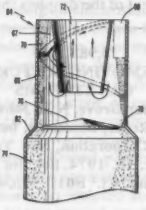
3,988,133
CYCLONE APPARATUS

Joseph L. Schady, Beechurst, N.Y., assignor to Alpha Sheet Metal Works, Inc., Woodside, N.Y.

Division of Ser. No. 417,362, Nov. 19, 1973, which is a continuation-in-part of Ser. No. 198,847, Nov. 15, 1971, abandoned. This application Sept. 8, 1975, Ser. No. 611,173

Int. Cl.² B01D 45/12

U.S. Cl. 55—459 R **2 Claims**



1. An air classifier for separating particulate matter from a gaseous carrier comprising

a cylindrically shapped separating chamber,

tangential air inlet conduit means,

axial and concentric air outlet conduit means,

means for directing the air introduced into said separating chamber to rotate thereabout in a predefined flow path whereby a separating vortex will be formed and the entrained particulate matter will be thrown radially outwardly towards the walls of said separating chamber,

a cylindrical collecting chamber coaxial with said separting chamber wherein the diameter of said collecting chamber is substantially larger than the diameter of said separating chamber,

a flared out skirt member joining said collecting separating chambers,

conical baffel means concentric with and positoned at the bottom of said collecting chamber with the apex thereof projecting thereinto,

said conical baffle means defining an annular opening with said flared out skirt member whereby stray currents created by the separating vortex become suddenly expanded when passed therethrough, releasing any particulate matter entrained therein thereby assuring that the separated particulate matter will fall to the bottom of said collecting chamber.

3,988,134

DENTAL OFFICE SYSTEM

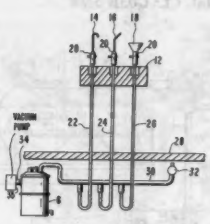
Stanton D. Gandrud, 20681 McClelland Road, Cupertino, Calif. 95014

Continuation of Ser. No. 436,943, Jan. 28, 1974, Pat. No. 3,847,573, which is a continuation-in-part of Ser. No. 122,954, March 10, 1971, abandoned. This application Nov. 6, 1974, Ser. No. 521,356

The portion of the term of this patent subsequent to Nov. 12, 1991, has been disclaimed.

Int. Cl.² B01D *45/08*

U.S. Cl. 55—319 15 Claims



1. A dental office vacuum system comprising:

water separator means having an input and an output for separating water from a line carrying air and water,

a vacuum pump connected to said output downstream of said separator means,

at least one main vacuum line connected at one end to said water separator means input,

automatic valve means connected to the other end of said main line for providing continuous air flow through said main line when said vacuum pump is operating, and

a plurality of dental handpieces connected through tubes to said at least one main vacuum line at a point between said automatic valve and said separator.

3,988,135

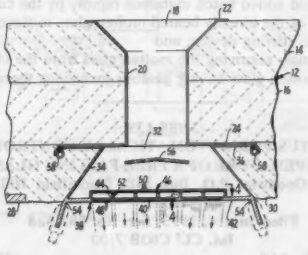
ASSEMBLY FOR THE DRAWING OF GLASS FIBERS

Charles H. Coggin, Jr., Glendora, Calif., assignor to Kaiser Glass Fiber Corporation, Azusa, Calif.

Filed July 28, 1975, Ser. No. 599,720

Int. Cl.² C03B *37/02*

U.S. Cl. 65—1 9 Claims



1. In a glass fiber drawing assembly of the type comprising a non-tip orifice plate with a drawing area having a flat undersurface through which fibers are drawn, means for drawing glass fibers from the plate, a supply nozzle for directing bulk gas against the undersurface of the plate and current supply means to direct current through the plate to effect the resistance heating thereof, an improved orifice plate for use in the assembly, said plate comprising:

a non-tip plate element having a drawing area perforated by a multitude of drawing orifices extending therethrough in closely spaced relationship to one another, said plate element having upper and lower surfaces through which said orifices open, at least the lower of which surfaces is planar;

intersecting reinforcing ribs integrally joined to one another at the intersections thereof and integrally joined to the upper surface of the plate element and extending across the drawing area thereof; and,

a reinforcing plate integrally joined to said ribs in spaced parallel relationship to the upper surface of the plate element, said reinforcing plate being substantially coextensive with the drawing area of the plate element and perforated by a multitude of closely spaced openings having a total resistance to flow less than the total resistance to flow of the orifices in the plate element.

3,988,136

METHOD FOR REDUCING THERMALLY INDUCED FRACTURE OF CATHODE RAY TUBE BULBS DURING SALVAGE

Melvin F. Rogers, Western Springs, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Division of Ser. No. 430,828, Jan. 4, 1974, Pat. No. 3,894,858. This application Apr. 17, 1975, Ser. No. 568,954

Int. Cl.² C03B *23/00*, *19/00*

U.S. Cl. 65—23 8 Claims

1. In a television cathode ray tube manufacturing process of separating a nonskirted glass front panel and a glass funnel sealed together with a glass frit material wherein the glass exterior surfaces are successively heated and then cooled in order to fracture the frit seal by thermal shock wherein, during cooling, a temperature gradient is established between (i) a relatively rapidly cooling exterior surface area of an extreme border of the front panel and (ii) a more slowly cooling interior portion of the border, a method for reducing the circumferential tension produced at the front panel extreme border by said temperature gradient to thus lessen the likelihood of front panel fracture, said method comprising applying prior to or during said cooling a thermal insulator over the front panel extreme border and vicinity so as to locally reduce the rate of glass surface cooling and thus the thermally-induced tensile forces at said glass surface.

3,988,137

METHOD AND APPARATUS FOR LUBRICATING GLASS MOLDS

George I. Goodwin, P.O. Box 348, Bloomfield Hills, Mich. 48013

Filed June 4, 1975, Ser. No. 583,534

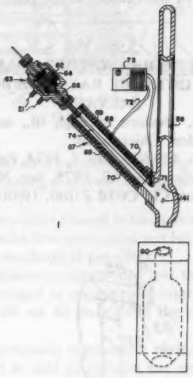
Int. Cl.² C03B *7/00*, *39/00*

U.S. Cl. 65—26 24 Claims

1. An apparatus for lubricating glass forming molds which receive charges of molten glass in a glass manufacturing operation and form these charges into desired shapes, including means for delivering a selected quantity of normally dry, thermally inert lubricating compound into container means supplied with a fluid carrying medium, mixing means operatively disposed in associatin with said container means for mixing said metered amount of said lubricating compound in said fluid carrying medium such that said lubricating com-

pound is dispersed and suspended in said fluid carrying medium to form a lubricating mixture, delivery conduit means to transmit said lubricating mixture to said molds, and injection means associated with said delivery conduit means including means to supply a measured amount of said lubricating mixture to the interior surface areas of said molds and means to sense the movement of said glass charges in a delivery chute prior to delivery of said glass charges into said molds, said means to sense actuating said means to supply in response to the movement of said glass charges in a delivery chute causing a measured amount of said lubricating mixture to be supplied to the interior surface areas of said molds prior to delivery of said glass charges into said molds.

8. A method of lubricating glass forming molds which receive charges of molten glass in a glass manufacturing process



and form these changes into desired shapes, particularly adapted to protect the surface areas of the molds which come into contact with the molten glass and facilitate release of the formed glass products from these mold surfaces thereby preventing marking and stressing of the formed glass, characterized by the steps of

mixing a fluid carrying medium with a selected amount of normally dry, thermally inert lubricating compound to form a lubricating mixture, in which said lubricating compound is dispersed and suspended in said fluid carrying medium, and rapidly pre-heating a selected amount of said mixture sufficiently prior to its intorduction into said molds to vaporize said fluid carrying medium of said selected amount of said mixture, such that said fluid carrying medium will suddenly greatly expand in volume causing said thermally inert lubricating compound suspended in said carrying medium to be carried with said expanding carrying medium toward and into the interior of each of said molds to coat and line the interior surface areas thereof.

20. A lubricant mixture particularly adapted for use in glass manufacturing operation to coat the interior surface areas of glass forming molds which come in contact with charges of molten glass to protect these surface areas and to facilitate the release of the formed glass product from these mold surfaces thereby preventing marking or stressing of the formed glass, including fluid carrying medium comprising a superheated steam and a thermally inert lubricating compound comprising carbon monofluoride which, upon continuous mixing and agitation with said fluid carrying medium will remain in suspension in said fluid carrying medium and will be carried by said fluid carrying medium in suspension such that expansion of said fluid carrying medium occurs and said thermally inert lubricating compound will be dispersed on the interior surfaces of said molds upon entry into said molds to uniformly coat said surfaces, said fluid carrying medium being evaporated or broken into chemical elements upon contact with said mold surfaces and/or molten glass charges rather than leaving a residue within the mold.

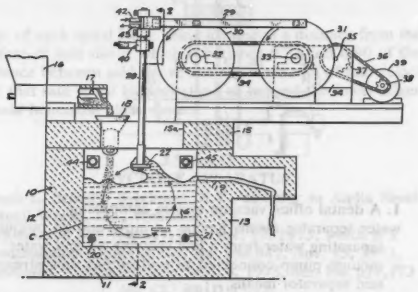
3,988,138
METHOD AND APPARATUS FOR MELTING GLASS-MAKING MATERIALS

Robert R. Rough, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 502,264, Sept. 3, 1974, abandoned, which is a continuation-in-part of Ser. No. 375,532, July 2, 1973, Pat. No. 3,850,606. This application May 15, 1975, Ser. No. 578,055

Int. Cl.² C03B 5/18

U.S. Cl. 65—134 **6 Claims**



1. A method of continuously mixing and melting glass-making materials which comprises:

heating glass-making materials in a chamber to provide a pool of molten glass;

positioning a plurality of electrodes within said chamber;

positioning a rotatable bladed stirring device in said molten glass;

applying electric current between said stirring device and said electrodes to provide a Joule heating effect in the molten glass between the stirring device and the electrodes in said chamber;

rotating said stirring device in a circular path in a vertical plane, about a horizontal axis at a rate sufficient to produce a vortex in the glass at said vertical axis;

introducing additional cold glass forming batch materials continuously into said chamber and into said vortex;

continuing the application of electric current to mix and melt said added batch materials rapidly by the combined action of the already heated molten glass in the chamber and the stirring device; and

continuously removing the molten glass from the chamber, said molten glass having gaseous inclusions therein.

3,988,139
APPARATUS FOR AUTOMATICALLY CONTROLLING THE TEMPERATURE OF A FREE-FALLING GLASS GOB

George I. Goodwin, P.O. Box 348, Bloomfield Hills, Mich. 48013

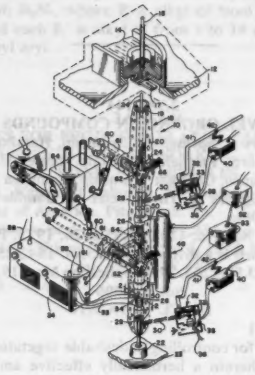
Filed June 4, 1975, Ser. No. 583,535

Int. Cl.² C03B 7/00

U.S. Cl. 65—162 **19 Claims**

1. An apparatus particularly adapted for use in glass manufacturing to control the temperature of free-falling molten glass gobs between a hearth or tank containing molten glass and mold means for receiving said glass gobs, including conduit means extending generally between said hearth and said mold means, said conduit means being formed of a strong, thermally conductive material which is resistant to the high temperatures of said molten glass gobs, said conduit means defining a passageway of sufficient dimension to convey said

glass gobs along it from said hearth to said mold means, modifying air means in communication with said passageway to introduce modified air into said passageway, electrical heating elements associated with said conduit means at desired locations along the length thereof and operable to transfer heat



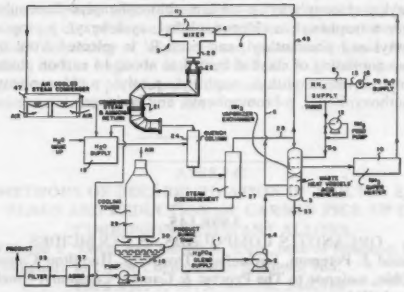
through said thermally conductive conduit means to said glass gobs as said gobs move along said passageway formed by said conduit means to thereby control the temperature of said gobs and maintain a desired uniform temperature of said gobs between said hearth and said molds.

3,988,140

PROCESS FOR MAKING STABLE SLUDGE-FREE AMMONIUM POLYPHOSPHATE FERTILIZER SOLUTIONS

Tom V. Burns, 1312 Kathleen St., Metairie, La. 70003, and Sergio Ortega Pierres, Anaxagoras 430, Mexico City, Mexico

Filed Jan. 30, 1975, Ser. No. 545,523
Int. Cl.² C05B *7/00*
U.S. Cl. 71—34 9 Claims



1. A process of preparing a stable, sludge-free ammonium polyphosphate fertilizer solution which comprises introducing a blend of impure wet process phosphoric acid having a P_2O_5 content of from about 58 to 68 percent by weight and a solvent extracted wet process phosphoric acid of reduced Fe_2O_3, Al_2O_3, MgO and free H_2O content, the proportions of impure wet process phosphoric acid to solvent extracted wet process phosphoric acid providing a phosphoric acid blend containing the following materials in the defined amounts:

P_2O_5	about 59%
CaO	up to about .06%
SO_4	up to about 3.5%
F	up to about 0.28%
Fe_2O_3	up to about 0.35%
Al_2O_3	up to about 0.45%
MgO	up to about 0.35%
Free Water	up to about 14.0%

said phosphoric acid having a S.G. at 60/60 up to about 1.7 into a mixing zone;

introducing ammonia vapor into said mixing zone in an amount of from about 0.8 to 1.2 moles per mole of phosphoric acid;

conveying said mixed acid blend and ammonia through a reaction zone maintained at a temperature of from 560° to 600° F for from at least 0.10 second to effect reaction between the acid bland and ammonia, the reaction product comprising a hot melt ammonia polyphosphate product; and

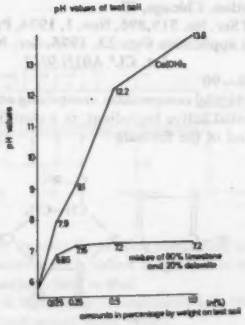
substantially immediately quenching said hot melt to provide a solution comprising ammonium polyphosphate at least 50% of the P_2O_5 content of which is in the non-orthophosphate form and suspended insoluble metallic phosphates and insoluble organic materials as solid finely divided impurities, separating steam and unreacted ammonia from said solution of quenched product, condensing and recycling said steam and ammonia for use in said quenching step, aging the resulting solution for about 10 to 20 days to effect precipitation and nucleation of said insolubles into filterable form and filtering the aged solution to provide said stable, sludge-free ammonium polyphosphate solution.

3,988,141

METHOD FOR IMPROVING SOIL

Yoshiaki Kajiyama, Room No. 813 Mezon Koushein, 14-18 Futamicho, Nishinomiya, Hyougo, Japan

Filed Jan. 23, 1975, Ser. No. 543,410
Claims priority, application Japan, Feb. 1, 1974, 49-13959; July 24, 1974, 49-94427
Int. Cl.² C05D *3/02*
U.S. Cl. 71—63 7 Claims


pH values of test soil
pH values
Ca(OH)₂
mixture of 80% limestone and 20% dolomite
amounts in percentage by weight on test soil

1. A method for improving soil by mixing finely divided coral fossil limestone with the soil to maintain soil pH at a substantially neutral value.

3,988,142

INCREASING CARBOHYDRATE DEPOSITION IN PLANTS WITH N-PHOSPHONO-METHYLGLYCINE AND DERIVATIVES THEREOF

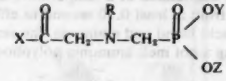
John E. Franz, Crestwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 223,351, Feb. 3, 1972, Pat. No. 3,853,530, which is a continuation-in-part of Ser. No. 123,057, March 10, 1971, abandoned. This application Oct. 1, 1974, Ser. No. 510,923

Int. Cl.[2] A01N 9/36

U.S. Cl. 71—86 26 Claims

1. A method of increasing carbohydrate deposition in plants which comprises applying to said plants an effective, carbohydrate increasing, non-lethal amount of a compound selected from those having the formula



wherein:

R is selected from the group consisting of hydrogen, formyl, acetyl, benzoyl, nitrobenzoyl and chlorinated benzoyl;

Y and Z are each independently selected from the group consisting of hydrogen and lower alkyl;

X is selected from the group consisting of hydroxy, alkoxy and chloroalkoxy of up to 12 carbon atoms, alkoxyalkoxy, alkoxyalkoxyalkoxy and chloroalkoxyalkoxy of up to 8 carbon atoms, lower alkenoxy and cyclohexyloxy;

and certain salts thereof, which salts are selected from the group consisting of the Group I and II metals having an atomic number up to 30, hydrochloride, pyridine, ammonium, lower aliphatic hydrocarbon amine, lower alkanol amine and aniline.

3,988,143

1-THIADIAZOLYL-6-ALKOXYTETRAHYDROPYRIMIDINONES

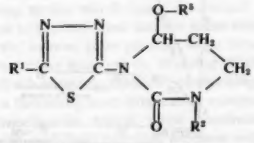
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 519,896, Nov. 1, 1974, Pat. No. 3,932,410. This application Oct. 23, 1975, Ser. No. 625,214

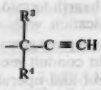
Int. Cl.[2] A01N 9/12

U.S. Cl. 71—90 9 Claims

1. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of the formula



wherein R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromoalkyl, trifluoromethyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromoalkyl, and



wherein R^3 and R^4 are each selected from the group consisting of hydrogen and lower alkyl; and R^5 is lower alkyl.

3,988,144

NOVEL ORGANOTIN COMPOUNDS

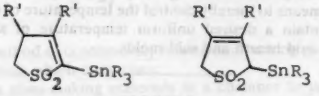
Donald J. Peterson, Springfield Township, Hamilton County; James F. Ward, Fairfield Township, Butler County, and Ralph A. Damico, Colerain Township, Hamilton County, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 410,057, Oct. 26, 1973, Pat. No. 3,897,553, which is a division of Ser. No. 184,225, Sept. 27, 1971, Pat. No. 3,808,264. This application Mar. 19, 1975, Ser. No. 560,006

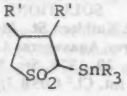
Int. Cl.[2] A01N 9/14

U.S. Cl. 71—91 2 Claims

1. A process for controlling undesirable vegetation comprising applying thereto a herbicidally effective amount of an organotin-substituted compound selected from the group consisting of compounds of the formula



and



where each R is selected from the group consisting of alkyl of from 1 to about 14 carbon atoms, phenyl, naphthyl, methoxyphenyl, p-chlorophenyl, p-tolyl, m-chlorophenyl, o-fluorophenyl, m-nitrophenyl, α-chloronaphthyl, cyclohexyl, p-propoxyphenyl and phenanthryl, and each R′ is selected from the group consisting of alkyl of from 1 to about 14 carbon atoms, phenyl, α-nitronaphthyl, naphthyl, p-tolyl, p-chlorophenyl, o-methoxyphenyl, p-bromophenyl, and hydrogen.

3,988,145

ORGANOTIN COMPOUNDS AS HERBICIDES

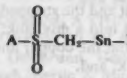
Donald J. Peterson, Springfield Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 368,141, June 8, 1973, Pat. No. 3,897,560, which is a division of Ser. No. 164,941, July 21, 1971, Pat. No. 3,784,580, which is a continuation-in-part of Ser. No. 10,303, Feb. 10, 1970, abandoned. This application Apr. 3, 1975, Ser. No. 563,912

Int. Cl.[2] A01N 9/00

U.S. Cl. 71—97 11 Claims

1. A method of combatting undesirable vegetation which comprises applying thereto an herbicidally effective amount of a compound of the formula



where A is alkyl of from 1 to 14 carbon atoms; hydrocarbyl aryl; chloro, diloweralkylamino or methoxy substituted hydrocarbyl aryl; R_2N-, where R is alkyl of from 1 to 14 carbon atoms; and each R′ is alkyl of from 1 to 14 carbon atoms or hydrocarbyl aryl.

3,988,146

PROCESS FOR PRODUCING LARGE PARTICLE SIZE ALUMINUM PIGMENTS BY WORKING AND WELDING SMALLER PARTICLES

Thomas J. Kondis, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 307,334, Nov. 17, 1972, Pat. No. 3,890,166. This application May 5, 1975, Ser. No. 574,368

Int. Cl.² B22F *1/00*

U.S. Cl. 75—.5 A **3 Claims**

1. The process of producing aluminum particles of predetermined shape and size which comprises milling in a non-oxidizing atmosphere particulate aluminum of a given particle size range in the presence of an inert liquid selected from the group consisting of aliphatic and aromatic organic liquids which do not fragment into free radicals to thereby promote welding of the particulate aluminum into larger particles of predetermined shape and size.

3,988,147

METHODS OF DECARBURIZATION OF MOLTEN ESR SLAGS AND REDUCTION OF CARBON PICK UP IN CORROSION RESISTANT ALLOYS

Wilfredo V. Venal, and Joseph H. Klein, both of Kokomo, Ind., assignors to Cabot Corporation, Kokomo, Ind.

Filed Apr. 9, 1975, Ser. No. 566,310

Int. Cl.² C22B *4/06*; C21C *7/00*; C22B *9/10*

U.S. Cl. 75—10 R **9 Claims**

1. The method of electroslag remelting of nickel and cobalt base alloy materials to prevent weld heat affected zone corrosion resulting from precipitation of grain boundry carbides in such alloys comprising the step of decarburizing the ESR starting slag by adding a sufficient amount of Fe_2O_3 to the molten slag to react with sufficient carbon to evolve volatile oxides of carbon and reduce the carbon in the slag to the desired level prior to starting the remelting of the alloy material.

3,988,148

METALLURGICAL PROCESS USING OXYGEN

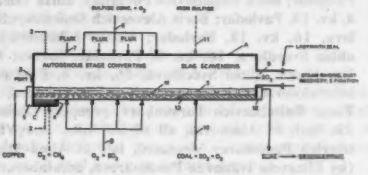
Paul E. Queneau, Cornish, N.H., and Reinhardt Schuhmann, Jr., West Lafayette, Ind., assignors to Q-S Oxygen Processes, Inc., Portland, Maine

Continuation of Ser. No. 357,012, May 3, 1973, Pat. No. 3,941,587. This application Sept. 29, 1975, Ser. No. 617,371

The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.

Int. Cl.² C22B *15/00*

U.S. Cl. 75—74 **1 Claim**



1. A continuous autogenous process for recovering metal values from non-ferrous metal sulfide concentrates wherein

a molten bath is established and maintained beneath a sulfur dioxide-rich gaseous phase in an elongated tiltable rounded cross-section furnace into which concentrates, flux and oxygen are introduced while value metal-rich material, slag and off-gases are separately removed and

at least a substantial portion of the oxygen is continuously bottom blown into said molten bath through several independently regulated subsurface injectors distributed lengthwise of the furnace along a substantial portion of said bath and

the injector oxygen streams are surrounded by a shielding fluid comprising at least one fluid selected from the group consisting of sulfur dioxide, water, and a hydrocarbon.

3,988,149

METALLURGICAL PROCESS USING OXYGEN

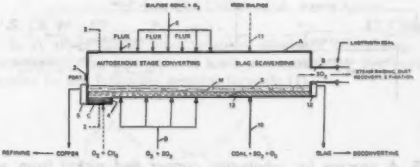
Paul E. Queneau, Cornish, N.H., and Reinhardt Schuhmann, Jr., West Lafayette, Ind., assignors to Q-S Oxygen Processes, Inc., Portland, Maine

Continuation of Ser. No. 357,012, May 3, 1973, Pat. No. 3,941,587. This application Sept. 29, 1975, Ser. No. 617,374

The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.

Int. Cl.² C22B *15/00*

U.S. Cl. 75—74 **1 Claim**



1. A process for treating liquid slag containing non-ferrous metal values to recover such values therefrom in the form of metal sulfides, characterized in that

a. a bath of such liquid slag is established in a tiltable non-rotary sealed refractory-lined vessel;

b. a carbonaceous reducing agent, sulfur dioxide and oxygen are directed upwardly through said slag bath in amounts effective to create strong reducing conditions and controlled turbulence in said slag to form metal sulfides therein; and

c. said metal sulfides are separated from said slag.

3,988,150
PROCESS FOR EXTRACTION OF GALLIUM FROM SODIUM ALUMINATE LIQUORS

Elena Leonidovna Shalavina, ulitsa Vinogradova, 33, kv. 20; Elizaveta Ivanovna Ponomareva, ulitsa Furmanova, 51, kv. 24; Arkady Ivanovich Zazubin, ulitsa Vinogradova, 33, kv. 20; Tatyana Dmitrievna Ostapenko, ulitsa Mira, 144, kv. 57, all of Alma-Alta; Galina Artemievna Ivanova, ulitsa Shexpira, 3, kv. 5, Donetsk; Gennady Alexeevich Romanov, ulitsa Astronomicheskaya, 63, kv. 18, Alma-Alta; Evgeny Nikolaevich Bespalov, ulitsa Karpenko, 23, kv. 39, Nikolaev; Igor Vladimirovich Prokopov, ulitsa Dzerzhinskogo, 43, kv. 27, Pavlodar; Boris Stepanovich Povazhny, ulitsa Tsiolkovskogo, 4, kv. 14, Pavlodar; Boris Alexeevich Smirnov, ulitsa Sverdlova, 16, kv. 18, Pavlodar; Viktor Nikolaevich Vasiliev, ulitsa Sverdlova, 16, kv. 8, Pavlodar; Salavat Ishanovich Turakbaev, ulitsa Sverdlova, 16, kv. 8, Pavlodar; Askar Minliakhmedovich Kunaev, ulitsa Vinogradova, 20, kv. 7; Turar Baltabaevich Tursunbaev, prospekt Lenina, 70, kv. 19, both of Alma-Ata, all of U.S.S.R., and Viktor Dmitrievich Ponomarev, deceased, late of Alma-Ata, U.S.S.R. (by Elizaveta Ivanovna Ponomareva, administratrix)

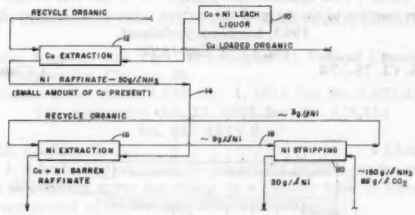
Filed Oct. 3, 1975, Ser. No. 619,500
Int. Cl.[2] C22B *58/00*
U.S. Cl. 75—109 12 Claims

1. A process for extraction of gallium from sodium aluminate liquors comprising the steps of: contacting a feedstock sodium aluminate liquor with stirring at an elevated temperature with a liquid gallium-aluminum alloy containing from 0.2 to 6% aluminum by weight to cause gallium cementation from the liquor; and separating the gallium recovered by the cementation procedure from the sodium aluminate liquor.

3,988,151
LIQUID ION EXCHANGE PROCESS FOR THE RECOVERY OF COPPER AND NICKEL

Roald R. Skarbo, Lokken Verk, Norway, and David L. Natwig, Brighton, Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 380,792, July 19, 1973, Pat. No. 3,907,966. This application June 16, 1975, Ser. No. 587,106
Int. Cl.[2] C01G *3/00, 51/00, 53/00*
U.S. Cl. 75—119 10 Claims



5. A process for recovering copper and nickel from an aqueous ammoniacal leach liquor containing copper and nickel comprising the following steps:

a. first extracting copper from the leach liquor in a copper extraction circuit with an organic extractant to leave a raffinate that is depleted in copper values and high in nickel values;

b. thereafter extracting nickel from the raffinate of step (a) in a nickel extraction circuit;

c. separately stripping the copper loaded organic produced in step (a) in a copper stripping circuit and the nickel loaded organic produced in step (b) in a nickel stripping circuit.

d. thereafter introducing the stripped organic from the copper stripping circuit and the stripped organic from the nickel stripping circuit into a mix tank;

e. mixing the organics from the copper and nickel stripping circuits in the mix tank; and,

f. recycling a portion of the organic mixed in step (e) to the copper extraction circuit and recycling a portion of the organic mixed in step (e) to the nickel extraction circuit.

6. A process for treating an ammoniacal leach liquor containing copper, nickel, cobalt and molybdenum values in which the ammonia content of the ammoniacal leach liquor is reduced to a level of 30 g/l or less prior to extracting nickel comprising the steps of:

a. contacting the leach solution with an organic oxime to selectively extract copper from the leach solution;

b. stripping copper from the copper loaded organic oxime of step (a) with an acid;

c. subjecting the copper electrolyte produced in step (b) to electrowinning for the recovery of copper in the form of cathodes;

d. contacting the copper depleted leach solution of step (a) which has an ammonia content of 30 g/l or less with an organic oxime to extract nickel;

e. contacting the nickel loaded organic oxime produced in step (d) with a highly concentrated ammonium carbonate salt solution to strip a portion of the nickel loaded on the organic oxime;

f. stripping ammonia from the strip solution of step (e) to precipitate nickel contained in the strip solution as a basic carbonate;

g. recovering nickel from the precipitated carbonate of step (f);

h. recycling the nickel stripped organic oxime of step (e) to step (a), to extract copper, the recycling of the nickel stripped organic oxime to the copper extraction circuit of step (a) preventing the build-up of copper in the organic oxime used for nickel extraction; and,

recycling the organic stripped of copper in step (b) to step (d) to be used in extracting nickel.

3,988,152
EPOXY RESIN PHOTORESIST WITH IODOFORM AND BISMUTH TRIPHENYL

Jerome Roteman, Solon, Ohio, assignor to American Can Company, Greenwich, Conn.

Division of Ser. No. 369,086, June 11, 1973, Pat. No. 3,895,954. This application Feb. 26, 1975, Ser. No. 553,263
Int. Cl.[2] G03C *5/00, 1/68, 1/04*
U.S. Cl. 96—35.1 10 Claims

1. A method of preparing a photoresist image which comprises:

forming a mixture of (a) a monomeric or prepolymeric epoxide material or mixture thereof, said epoxide material being polymerizable to higher molecular weights through the action of a cationic catalyst; with (b) a radiation-sensitive catalyst precursor which decomposes upon exposure to electromagnetic or electro-beam radiation to provide an active catalyst effective to initiate polymerization of said epoxide material, said precursor being an organohalogen compound wherein the organo radicals are alkyl, aryl, alkaryl, aralkyl, alkoxy and aroxy in combination with an oranometallic compound having the formula R_3M wherein M is P, As, Sb or Bi and R is a hydrocarbyl radical or hydrogen with the proviso that at least one R is a hydrocarbyl radical;

applying said mixture to a substrate;

masking predetermined portions of said substrate;

exposing said unmasked portions of said substrate to electromagnetic or electron beam irradiation to effect polymerization;

removing said masking means; and thereafter applying a suitable solvent for removal of unpolymerized portions of said mixture.

3,988,153

METHOD OF FORMING A THIN FILM IRIS DIAPHRAGM FOR A CORPUSCULAR BEAM APPARATUS

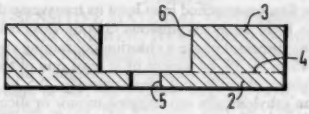
Alfred Politycki, Ottobrunn, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 21, 1975, Ser. No. 579,609

Claims priority, application Germany, May 27, 1974, 2425464

Int. Cl.² G21K 1/00

U.S. Cl. 96—36.4 8 Claims



1. A method of manufacturing a thin film iris diaphragm having at least one opening for passing a beam of particles of a corpuscular beam apparatus, in particular electron microscopes and vidicons, said iris diaphragm having a thin metal layer with at least one opening therethrough and an integral reinforcing portion of the same metal which is set back from the edge of each of the openings in the thin metal layer, said method comprising the steps of providing a substrate; applying at least one metal base film on a surface of the substrate; forming a first mask having a negative image of the configuration of the thin metal layer of the iris diaphragm on the metal base film by depositing on the base metal film a first coating of photo-sensitive material which is resistant to electro-depositing, by exposing selected areas of the first coating, and by developing the coating to form the first mask; electro-depositing a thin metal layer on the base film; forming a second mask having a negative image of the configuration of the reinforcing portion by applying a second coating of photo-sensitive material which is resistant to electro-depositing on the first coating and metal layer, by exposing the second coating of material with a negative image of the reinforcing portion, and by developing the second coating to form the second mask with a portion covering each opening of the thin metal layer and the thin metal layer surrounding each opening; electro-depositing a thick layer of the same metal as the thin metal layer to form the reinforcing portion; removing said masks; and then removing the substrate by selectively etching away the base metal film.

3,988,154

PHOTOGRAPHIC SUPPORTS AND ELEMENTS UTILIZING PHOTOBLEACHABLE OMICRON-NITROARYLIDENE DYES

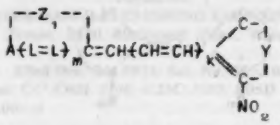
David M. Sturmer, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 443,654, Feb. 19, 1974, which is a continuation-in-part of Ser. No. 260,618, June 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 176,681, Aug. 25, 1971, abandoned. This application Feb. 3, 1975, Ser. No. 546,658

Int. Cl.² G03C 5/24, 5/26

U.S. Cl. 96—48 R 19 Claims

1. A process for preparing a photographic image which comprises imagewise exposing to electromagnetic radiation a light-sensitive photographic element comprising an otherwise transparent support containing therein a photobleachable o-nitro-substituted arylidene dye wherein said photobleachable dye has the following formula:



wherein

a. *k* represents 0 or 1;

b. *m* represents 0 or 1;

c. each L represents a methine group;

d. A represents oxygen, sulfur or N—R_1;

e. R_1 represents an alkyl group, an aralkyl group, a sulfoalkyl group, a sulfoatoalkyl group, an alkoxy carbonylalkyl group, an alkoxyalkyl group, an acyloxyalkyl group, a dialkylaminoalkylene group, a cycloaminoalkylene group, an alkenyl group or an aryl group;

f. Z_1 represents the nonmetallic atoms completing a cyanine dye type heterocyclic nucleus comprising a 5- or 6-membered heterocyclic ring whose skeletal atoms consist of the oxygen, sulfur or nitrogen atom of A, carbon atoms and one other atom chosen from the group consisting of carbon, oxygen, nitrogen, selenium and sulfur atoms; and

g. Y represents the atoms necessary to complete a phenyl or naphthyl group.

3,988,155

SILVER HALIDE PHOTOGRAPHIC EMULSION

Masanao Hinata; Haruo Takei; Akira Sato, and Tadashi Ikeda, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

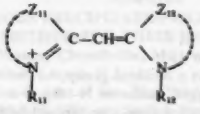
Filed Sept. 4, 1975, Ser. No. 610,352

Claims priority, application Japan, Sept. 4, 1974, 49-101488

Int. Cl.² G03C 1/14

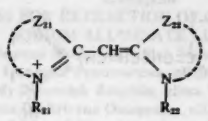
U.S. Cl. 96—69 17 Claims

1. A silver halide photographic emulsion containing, in supersensitizing amounts, at least one sensitizing dye represented by the following general formula (I)



(I)

wherein Z_{11} represents the atoms necessary to complete a pyridine nucleus or a quinoline nucleus; Z_{12} represents the atoms necessary to complete an oxazole nucleus, a benzoxazole nucleus, a naphthoxazole nucleus, an imidazole nucleus, a benzimidazole nucleus or a naphthoimidazole nucleus; and R_{11} and R_{12} each represents an aliphatic group with at least one of R_{11} and R_{12} having a carboxy or sulfo group; and at least one sensitizing dye represented by the following general formula (II)



(II)

wherein Z_{21} and Z_{22}, which can be the same or different, each represents the atoms necessary to complete a thiazole nucleus, a benzothiazole nucleus, a selenazole nucleus or a benzoselenazole nucleus; and R_{21} and R_{22} each represents an aliphatic group with at least one of R_{21} and R_{22} having a carboxy or sulfo group.

17. A color photographic light-sensitive material, which comprises at least two differently sensitive silver halide emulsion layers, at least one layer containing a coupler and at least one layer comprising the photographic emulsion as described in claim **1.**

3,988,156

PHOTOGRAPHIC SUPPORTS AND ELEMENTS UTILIZING PHOTOBLEACHABLE O-NITROARYLIDENE DYES

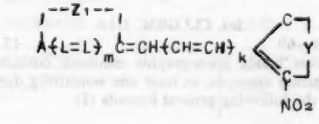
David M. Sturmer, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 443,654, Feb. 19, 1974, which is a continuation-in-part of Ser. No. 260,618, June 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 176,681, Aug. 25, 1971, abandoned. This application Feb. 3, 1975, Ser. No. 546,468

Int. Cl.² G03C *1/84, 1/72*

U.S. Cl. 96—84 R **21 Claims**

1. In a light-sensitive photographic element which comprises a support having coated thereon a transparent polymeric binder, the improvement in which said binder contains a photobleachable dye of the formula:



wherein

a. *k* represents 0 or 1;

b. *m* represents 0 or 1;

c. each L represents a methine group;

d. A represents oxygen, sulfur or N—R_1;

e. R_1 represents an alkyl group, an alkenyl group or an aryl group;

f. Z_1 represents the nonmetallic atoms completing a cyanine dye type heterocyclic nucleus comprising a 5- or 6-membered heterocyclic ring whose skeletal atoms consist of the oxygen, sulfur or nitrogen atom of A, carbon atoms and one other atom chosen from the group consisting of carbon, oxygen, nitrogen, selenium and sulfur atoms; and

g. Y represents the atoms necessary to complete a phenyl or naphthyl group.

3,988,157

PROCESS FOR ADHERING HYDROPHILIC LAYERS TO DIMENSIONALLY STABLE POLYESTER FILMS

August Jean Van Paesschen, Antwerp, and Lucien Janbaptist Van Gossum, Kontich, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Continuation of Ser. No. 379,485, July 16, 1973, abandoned. This application June 3, 1975, Ser. No. 583,205

Claims priority, application United Kingdom, July 17, 1972, 33295/72

Int. Cl.² G03C *1/78, 1/96*

U.S. Cl. 96—87 R **6 Claims**

1. A process for adhering hydrophilic layers to dimensionally stable polyester film supports, which comprises applying to polyester film unstretched in at least its transverse direction an adhesive layer from an aqueous coating dispersion comprising as the dispersal phase a chlorine-containing copolymer formed of 45 to 99.5% by weight of at least one of the monomers vinylidene chloride and vinyl chloride, 0.5 to 10% by weight of an ethylenically unsaturated mono- or dicarboxylic acid or of N-vinylpyrrolidone, and 0 to 54.5% by weight of at least one copolymerizable monomer taken from acrylamides, methacrylamides, esters of acrylic acid, methacrylic acid and maleic acid, and N-alkyl maleimides; immediately applying thereto, without drying of said adhesive layer, a subbing layer from an aqueous gelatin solution containing a plasticizer for the gelatin, drying the two layers, stretching the thus-coated polyester film support to biaxially orient the same at a temperature up to about 90° C., heat-setting the stretched coated support, and applying to the subbing layer a hydrophilic layer.

3,988,158

PROCESS FOR ANTISTATIC TREATMENT OF LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIAL

Toshio Muramatsu; Koichi Nagayasu; Masayuki Kimura; Sadatugu Terada, and Masayoshi Mayama, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Inc., Tokyo, Japan

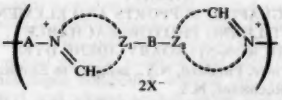
Filed Oct. 6, 1975, Ser. No. 620,137

Claims priority, application Japan, Oct. 7, 1974, 49.115853

Int. Cl.² G03C *1/78;* **H01B** *1/00*

U.S. Cl. 96—87 A **3 Claims**

1. A process for the antistatic treatment of a light-sensitive silver halide photographic material, characterized by applying to the photographic material at least one member selected from polymers represented by the general formula,



wherein A is an alkylene, alkenylene, arylene, aralkylene or arylenealkylene group having 2 to 18 carbon atoms, or a group of the formula $-R_1COR_2-$, $-R_3COR_4COR_5-$, $-R_6-OR_7)_m$, $-R_8COOR_9OCOR_{10}-$, $-R_{11}OCONHR_{12}NHCOOR_{13}-$ or $-R_{14}CONHR_{15}NHCOR_{16}-$ group; B is a simple bond, or a group selected from $-NHCOR_{17}CONH-$ and A (where R_1 to R_{17} are individually an alkylene group having 1 to 10 carbon atoms or a phenylene group, and m is an integer of 1 to 4); Z_1 and Z_2 are individually a non-metallic atom grouping necessary to form a 5- or 6-membered ring together with the —N=CH—group (or may bond to B in the form of the quaternary salt

X^- is an anion; and n is a positive integer.

2. A process for the antistatic treatment of a light-sensitive silver halide photographic material, as claimed in claim 1, wherein said polymers are those having a —CO— group in the molecule.

3,988,159

LIGHT-SENSITIVE MATERIAL CONTAINING NITRONE FOR FORMING HEAT-FIXED IMAGES

Sheldon Irwin Schlesinger, Hightstown, N.J., assignor to American Can Company, Greenwich, Conn.

Division of Ser. No. 93,414, Nov. 27, 1970, which is a continuation of Ser. No. 656,685, July 28, 1967, abandoned. This application July 2, 1973, Ser. No. 375,348

Int. Cl.² G03C *1/00, 1/52, 1/68*

U.S. Cl. 96—88 **29 Claims**

1. A light-sensitive medium for forming visible heat-fixed images, consisting essentially of: a support carrying a composition consisting essentially of a photosensitive nitrone having the formula $RCH=N(\rightarrow O)R'$, where R is selected from the group consisting of aryl, aroyl, arylvinylene, and furyl groups and R′ is an aryl group, said nitrone being adapted upon exposure to actinic radiation to be converted to a product giving increased optical densities in the exposed image areas, and image-intensifying means, for further increasing optical density responsive to said conversion of the nitrone upon exposure, in the form of a compound selected from the group consisting of diphenylamine, p-phenylenediamine, N,N′-diphenyl-p-phenylenediamine, indole, 3-indolylacetic acid, carbazole, benzimidazole, rhodanine, and p-methoxyphenol.

9. A light-sensitive medium for forming visible heat-fixed images, consisting essentially of: a support carrying a composition consisting essentially of a photosensitive nitrone having the formula $RCH=N(\rightarrow O)R'$, where R is selected from the group consisting of aryl, aroyl, arylvinylene, and furyl groups and R′ is an aryl group, and a heat-fixing catalyst in the form of a compound selected from the group consisting of tricresyl phosphate, phosphorus trichloride, phosphorus pentachloride, sulfur dioxide, thionyl chloride, acetic anhydride, and maleic anhydride whereby upon exposure to actinic radiation said nitrone is converted to a product giving increased optical densities in the exposure image areas of said medium, while upon subsequent heat-fixing said nitrone in unexposed image areas is converted to a radiation-stable product of low optical density.

16. A light-sensitive medium for forming visible heat-fixed images consisting essentially of: a support carrying a composition consisting essentially of a photosensitive nitrone having the formula $RCH=N(\rightarrow O)R'$, where R is selected from the group consisting of aryl, aroyl, arylvinylene, and furyl groups and R′ is an aryl group and an unsaturated compound for increasing the permanent contrast between exposed and unexposed image areas, said unsaturated compound being selected from the group consisting of (a) the lower alkyl esters of acrylic acid, methyl-substituted acrylic acid, and fumaric acid, and the nitriles corresponding to said acids, (b) N-phenylamides, N-lower-alkylamides, and N-lower-hydroxyalkyl amides of acrylic acid and methyl-substituted acrylic acid, (c) N-vinylsuccinimide and N-vinyl-phthalimide, (d) styrene and phenylacetylene and (e) 3-sulfolene,

whereby upon exposure to actinic radiation said nitrone is converted to a product giving increased optical densities in the exposed image areas, while upon subsequent heat-fixing said nitrone in unexposed image areas is converted to a permanent radiation-stable product of low optical density including a reaction product of the unexposed nitrone and said unsaturated compound.

3,988,160

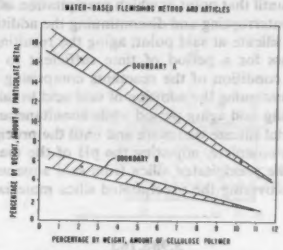
WATER-BASED FLEMISHING COMPOSITION

James J. Trexel, 2530 Blackwood Road, Wilmington, Del. 19810

Filed Dec. 24, 1974, Ser. No. 536,100

Int. Cl.² C08L *1/08*; C23C *3/00*; B05D *5/00*

U.S. Cl. 106—1 **2 Claims**


WATER-BASED FLEMISHING METHOD AND ARTICLES
BOUNDARY A
BOUNDARY B
PERCENTAGE BY WEIGHT AMOUNT OF PARTICULATE METAL
PERCENTAGE BY WEIGHT, AMOUNT OF CELLULOSE POLYMER

1. A metal dispersion useful for coating solid substrate surfaces with a flemish-like, antique finish, comprising:

a. about 0.1 to 15% by weight of water-soluble cellulose polymer selected from the group of sodium carboxymethyl cellulose, carboxymethyl hydroxyethyl cellulose, hydroxyethyl celluose and hydroxypropyl cellulose; and polyvinyl alcohol or mixtures thereof;

b. about 0.1 to 16% by weight of a particulate metal powder selected from the group consisting of aluminum, bronze, copper, gold, silver and mixtures thereof;

c. 0 to about 10% by weight of dye or pigment; and

d. about 59 to 99.8% by weight of water, polar solvents or water-solvent blends.

3,988,161

FOAMED SODIUM SILICATE CERAMIC AND METHOD OF MANUFACTURING THE SAME

Yasuhisa Kaneko; Katsumi Kondo; Fumiyoshi Noda; Mikio Murachi, and Yuji Watanabe, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 28, 1974, Ser. No. 473,664

Claims priority, application Japan, May 28, 1973, 48-059473

Int. Cl.² C04B *21/00*

U.S. Cl. 106—75 **2 Claims**

1. Foamed sodium silicate ceramic having an improved resistance to thermal shock at temperatures over 800° C comprising a first component consisting essentially of 30–36% by weight of aluminum hydroxide plus 5–20% by weight of powdered ceramic fibers, and a second component constituting the balance of the foamed ceramic and consisting essentially of sodium silicate.

3,988,162

AMORPHOUS PRECIPITATED SILICA PRODUCTS AND METHOD FOR THEIR PRODUCTION

Satish K. Wason, Churchville, Md., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation-in-part of Ser. No. 286,655, Sept. 6, 1972, Pat. No. 3,893,840. This application Oct. 31, 1974, Ser. No. 519,720

Int. Cl.² C09C *1/28*; C01B *33/18*

U.S. Cl. 106—288 B **8 Claims**

1. A method for producing amorphous, precipitated silicas having improved chemical and physical properties including high abrasiveness and low wet cake moisture content prior to the drying thereof, said method comprising the steps of: acidulating an aqueous solution of an alkali metal silicate having an SiO_2/X_2O mol ratio in the range of from about 2.0 to 2.7

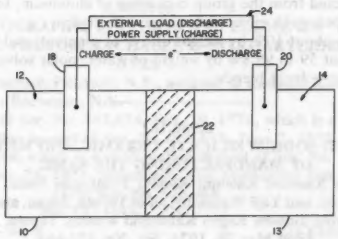
wherein X is selected from the group consisting of sodium, potassium, and lithium with an acid selected from the group consisting of sulfuric acid, nitric acid, and hydrochloric acid; said aqueous alkali metal silicate solution having a concentration on the order of about 1.0 to 2.5 pounds silicate per gallon, said acid being added as a dilute solution thereof and having a concentration of from about 10 to 25% by weight acid based on the weight of the solution thereof; continuing the addition of said acid until that point at which precipitation of said silica just begins; interrupting and discontinuing the addition of said acid to said silicate at said point; aging the resulting aqueous reaction mass for a period of time sufficient to obtain an equilibrium condition of the reactants comprising said reaction mass; continuing the addition of said acid to said aqueous mass following said aging period while simultaneously adding an alkali metal silicate therewith and until the precipitation of said silica is complete, adjusting the pH of the mass to acid, separating the precipitated silica from said aqueous reaction mass and recovering the precipitated silica material.

3,988,163

SODIUM-MIXTURE OF METAL HALIDES, SULFUR BATTERY

Jack C. Sklarchuk, Trenton, N.J., assignor to ESB Incorporated, Philadelphia, Pa.

Filed June 9, 1975, Ser. No. 584,987
Int. Cl.² H01M *43/00*
U.S. Cl. 429—103 **8 Claims**



1. A secondary battery comprising in combination:
a. a molten sodium negative reactant;
b. a positive reactant comprising molten sulfur and a mixture of halides said mixture of halides selected from the group consisting of halides of metals at least as noble as aluminum, halides of metalloids and mixtures thereof;
c. a solid member separating the negative and positive reactants, said member being selectively ionically conductive to sodium cations;
d. a molten sodium halide-aluminum halide electrolyte on the positive reactant side of the solid member;
e. carbon powder dispersed within the molten sulfur and mixture of metal halides; and
f. a current collector disposed in each the positive and negative reactants.

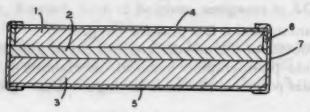
3,988,164

CATHODE MATERIAL FOR SOLID STATE BATTERIES

C. C. Liang, Andover, and L. H. Barnette, West Medford, both of Mass., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed Apr. 25, 1974, Ser. No. 464,085
Int. Cl.² H01M *35/02*
U.S. Cl. 429—191 **10 Claims**

1. A solid state electrochemical cell comprising an anode which is a metal above hydrogen in the electromotive series, a solid electrolyte chemically compatible with said anode, and a cathode comprising one or more metal chalcogenides as



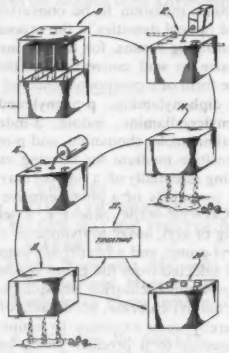
cathode active material, said cell being adapted to be operable at room temperature.

3,988,165

METHOD OF MAKING A LEAD-ACID STORAGE BATTERY, AND CELL, CAPABLE OF ACTIVATION BY THE ADDITION OF ELECTROLYTE

George W. Mao, and Anthony Sabatino, both of St. Paul, Minn., assignors to Gould Inc., Rolling Meadows, Ill.

Division of Ser. No. 486,663, July 8, 1974, which is a continuation-in-part of Ser. No. 377,525, July 9, 1973, abandoned. This application Oct. 6, 1975, Ser. No. 620,002
Int. Cl.² H01M *4/16*
U.S. Cl. 29—623.2 **13 Claims**



1. A method of treating the plates to be used in a lead-acid storage battery including a container having a plurality of cell compartments and a plurality of battery elements consisting of a plurality of positive and negative plates with separators positioned therebetween, the battery elements being electrically connected, to provide a battery capable of being stored and thereafter activated by the addition of electrolyte which comprises:
a. forming said plates by bringing said plates into contact with a formation electrolyte and applying current thereto,
b. draining the formation electrolyte from contact with said plates,
c. bringing said plates into contact with a treating solution affording under the conditions of contact a soluble metallic sulfate in an amount sufficient to condition said plates,
d. draining the treating solution from contact with said plates and
e. sealing the battery with the battery elements positioned therein to at least substantially prevent the ingress of air.

5. A method for making a lead-acid storage battery capable of being stored and thereafter activated by the addition of electrolyte and including a container having a plurality of cell compartments and a plurality of battery elements consisting of positive and negative plates with separators therebetween, the

battery elements being electrically connected, which comprises:

a. providing the battery,

b. forming the battery elements by filling the cell compartments with a formation electrolyte and applying current thereto,

c. draining the formation electrolyte from the cell compartments,

d. filling the cell compartments with an aqueous solution,

e. draining the aqueous solution from the cell compartments,

f. adding a treating agent in an amount sufficient to condition the battery elements in at least one of steps (b) and (d), with the proviso that, when the treating agent is added in step (b), steps (d) and (e) may be eliminated, said treating agent affording, under the conditions of treating, a soluble metallic sulfate and

g. sealing the battery to at least substantially prevent the ingress of air.

3,988,166

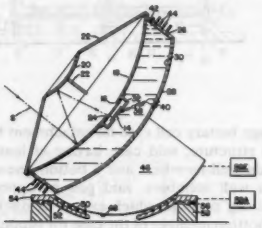
APPARATUS FOR ENHANCING THE OUTPUT OF PHOTOVOLTAIC SOLAR CELLS

Benjamin H. Beam, Sunnyvale, Calif., assignor to Beam Engineering, Inc., Sunnyvale, Calif.

Filed Jan. 7, 1975, Ser. No. 539,065

Int. Cl.² H01L 31/04; F24J 3/02

U.S. Cl. 136—89 **2 Claims**



1. Apparatus for generating electrical energy in a terrestrial environment comprising at least one photovoltaic cell, means for defining a liquid impervious closed chamber for containing said cell, said chamber defining means including a parabolic wall, said parabolic wall defining a solar energy pervious window therein, means for supporting said cell within said chamber adjacent to and spaced from said window by a distance, said parabolic wall having a reflective concave surface, means including said reflective concave surface for concentrating solar energy onto said cell through said window, a quantity of nonconductive liquid means substantially filling said chamber and surrounding said cell for absorbing heat energy therefrom, said quantity of said liquid energy absorbing means being sufficiently large to absorb and store heat energy from said photovoltaic cell to limit the temperature rise of said cell during the solar energy producing portion of a diurnal period, said distance being large enough to allow liquid circulation between said cell and said window and small enough to avoid substantial absorption of solar energy by the liquid means, the chamber defined by said chamber defining means having sufficient external surface area to afford transfer of heat from said liquid to the environment during the remainder of the diurnal period.

3,988,167

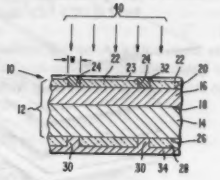
SOLAR CELL DEVICE HAVING IMPROVED EFFICIENCY

Henry Kressel, Elizabeth, and Vikram Lalitchandra Dalal, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 7, 1975, Ser. No. 556,430

Int. Cl.² H01L 31/04

U.S. Cl. 136—89 **7 Claims**



1. A solar cell device comprising:

a body of semiconductor material having means for collecting minority carriers generated by the absorption of solar radiation in the body,

an incident surface on the collecting means, through which radiation enters the collecting means,

a non-continuous oxide layer on a surface of the collecting means opposite the incident surface, the oxide layer having openings therethrough to the opposite surface, the openings being in the form of a pattern distributed across the opposite surface,

a reflecting contact on the oxide layer and on the opposite surface in the patterned openings,

a non-continuous oxide layer on the incident surface, the oxide layer having openings therethrough to the incident surface, the openings being in the form of a pattern, the patterned openings of the oxide layers on the opposite surface and the incident surface being of the same pattern and in alignment with each other, and

a contact on the incident surface in the patterned openings.

3,988,168

FLAT BATTERY AND MANUFACTURE THEREOF

Louis O. Bruneau, Weston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 478,105, June 10, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,053

Int. Cl.² H01M 10/00

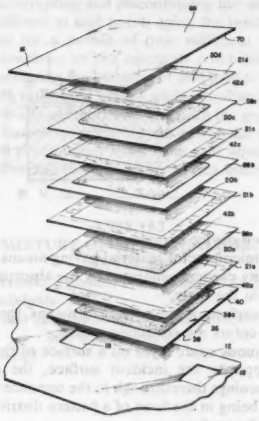
U.S. Cl. 429—129 **32 Claims**

1. In a flat primary battery structure comprising sheet type separators between electrochemically active battery sheet elements comprising anode materials, cathode materials and electrolyte combined with sheet type electrically conductive intercell connectors and electrically conductive oppositely disposed sheet type current collector elements combined to form a series connected multicell structure by seals entirely surrounding said electrochemically active elements and formed between the peripheries of the sheet type, electrically conductive, intercell connectors and contiguous portions of the sheet type separators;

the improvement wherein the overall peripheral dimensions of the separators exceed the overall peripheral dimensions of the connectors and active elements and the peripheral dimensions of the intercell connectors exceed the peripheral dimensions of the electrochemically active elements so that the peripheral portions of the separators extend beyond all the peripheral portions of the electrochemically active elements and intercell connectors sealed thereto.

17. In a method for constructing flat battery units comprising the steps of assembling the elements and components of the battery by fixedly placing in selectively spaced alignment

a predetermined sequence of electrolyte, anode and cathode materials in combination with discrete sheet type separators and discrete electrically active battery sheet elements including current collectors and sheet type, electrically conductive, intercell connectors to form a discrete series connected, multicell structure assembly by sealing the peripheries of the sheet type, electrically conductive, intercell connectors to contiguous portions of the sheet type separators to form continuous



seals entirely surrounding the anode, cathode and electrolyte materials;

the improvement wherein the overall peripheral dimensions of the separators are formed to exceed the overall peripheral dimensions of the connectors sealed thereto, and wherein said connectors are placed within the boundaries of said separators so that said separators overlap said connectors on all sides.

3,988,169

METHOD OF MOLDING CONNECTORS IN ELECTRICAL ACCUMULATORS

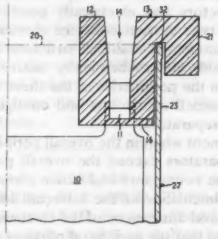
Thomas Fraser McLean, Sylvania Heights, Australia, assignor to Chloride Batteries Australia Limited, Australia

Filed Sept. 12, 1974, Ser. No. 505,309

Claims priority, application Australia, Sept. 12, 1973, 4818/73

Int. Cl.² H01M 2/26

U.S. Cl. 29—623.1 **9 Claims**



1. A method of assembling an electrical battery comprising the steps of:

a. providing a container having at least one partition wall to form at least two cell therein,

b. providing an aperture in said cell at least one partition wall as required for inter-cell connection,

c. placing a group of plates into each cell, each group of plates having at least one plate of positive polarity and at least one plate of negative polarity.

d. forming a channel mold adjacent the plates of like polarity in each group of plates, a part of each plate of like polarity being exposed in its respective channel,

e. flowing molten metal only in the channels with the battery container in an upright position to join said parts of like polarity in each cell and through the aperture in the partition wall to form an inter-cell connector; and

f. removing the mold subsequent to the soldification of the molten metal.

3,988,170

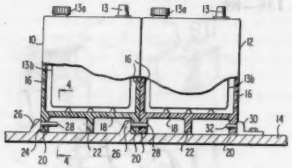
BATTERY CASES

Kjell H. M. Koch, Kungalv, and Rune Schmechtig, Nol, both of Sweden, assignors to Aktiebolaget Tudor, Sundyberg, Sweden

Filed June 30, 1975, Ser. No. 591,654

Int. Cl.² H01M 2/02

U.S. Cl. 429—163 **12 Claims**



1. A storage battery cell case for attachment to an underlying support structure, said case having at least one pair of opposing side wall members and a bottom member attached to said side wall members, said pair of opposed side wall members having portions which extend below the lower surface of the bottom member of the case for supporting the case, the outer surfaces of said portions being continuations of and in substantial alignment with the outer surfaces of said side wall members, said portions being shaped to be removably attached to cooperating portions of an underlying support structure.

3,988,171

BONDED ELECTRICAL CONTACT FOR THERMOELECTRIC SEMICONDUCTOR ELEMENT

Norman C. Miller, Woodland Hills, and Richard C. Saunders, Simi, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 150,325, June 7, 1971, abandoned, which is a division of Ser. No. 627,170, March 30, 1967, abandoned. This application Jan. 28, 1974, Ser. No. 437,100

Int. Cl.² H01V 1/14

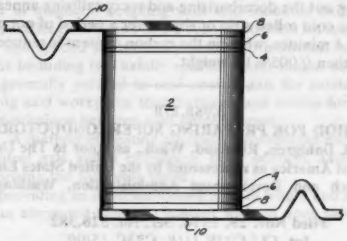
U.S. Cl. 136—237 **6 Claims**

1. A thermoelectric article which comprises: a thermoelectric member of the telluride class providing a first surface and a first electrically conductive member having a composite structure comprising

a first relatively thick electrical conductor shoe of an austenitic stainless steel having a second surface and

a first relatively thin adherent layer of a metal selected from the class consisting of iron, tungsten, molybdenum, and niobium directly bonded to and coextensively

covering said second surface and providing a third surface,



said first surface being in direct intimate contact with and bonded to said third surface of said first layer.

3,988,172

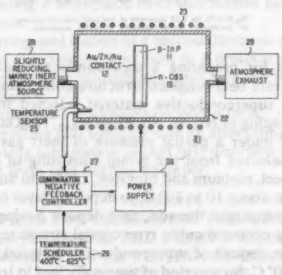
ANNEALING SOLAR CELLS OF INP/CDS

Klaus Jurgen Bachmann, Piscataway; Ernest Buehler, Chatham; Joseph Leo Shay, Marlboro, and Sigurd Wagner, Holmdel, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 16, 1975, Ser. No. 587,042

Int. Cl.² H01L *7/00, 31/04*

U.S. Cl. 148—1.5 **10 Claims**



1. A process comprising the steps of fabricating a device having a heterojunction between semiconductive regions of InP and CdS,

annealing said device for a selected time at a selected temperature in a non-oxidizing substantially inert atmosphere, said selected temperature being in the range from about 400° centigrade to about 625° centigrade, and

completing connections to said device for a desired photovoltaic response.

5. A process according to claim 1 in which the atmosphere includes a mixture of a first substantially inert component and a second component consisting essentially of hydrogen.

6. A process according to claim 5 in which the first component is nitrogen.

3,988,173

COLD ROLLED STEEL SHEET HAVING EXCELLENT WORKABILITY AND METHOD THEREOF

Tsuyoshi Kawano, Kisaragu, Japan, assignor to Nippon Steel Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 499,923, Aug. 23, 1974, abandoned, which is a continuation of Ser. No. 345,691, March 28, 1973, abandoned. This application July 11, 1975, Ser. No. 595,093

Claims priority, application Japan, Apr. 3, 1972, 47-32563; Apr. 3, 1972, 47-32564; Sept. 20, 1972, 47-93685

Int. Cl.² C21D *9/48*

U.S. Cl. 148—12 C **13 Claims**

1. A method for producing an Al-killed cold rolled steel sheet having excellent cold-workability and aging resistance, which comprises hot rolling and cold rolling a steel comprising

C ≦ 0.10 %
Si ≦ 0.10 %
Mn ≦ 0.50 %
N ≦ 0.008 %
sol.Al: 0.003 – 0.080 %
B: 0.0020 – 0.0050 %

and wherein the ratio B/N is less than 1.0, and the sum (Al + B) is ≦ 20 × N(%), **with the balance being iron and unavoidable impurities and then subjecting the thus obtained steel strip to recrystallization annealing at a temperature between** 650° C and the A_3 point for not longer than 10 minutes by a continuous annealing method and thereafter cooling the strip at a cooling rate from about 5° to 30° C/sec.

3,988,174

HOT ROLLED STEEL SHEET HAVING EXCELLENT WORKABILITY AND METHOD THEREOF

Tsuyoshi Kawano, Kisaragu, Japan, assignor to Nippon Steel Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 499,923, Aug. 23, 1974, abandoned, which is a continuation of Ser. No. 345,691, March 28, 1973, abandoned. This application July 11, 1975, Ser. No. 595,092

Claims priority, application Japan, Apr. 3, 1972, 47-32563; Apr. 3, 1972, 47-32564; Sept. 20, 1972, 47-93685

Int. Cl.² C21D *9/48*

U.S. Cl. 148—12 C **10 Claims**

1. A hot rolled steel sheet having excellent cold workability and ageing resistance consisting essentially of not more than 0.10% C, not more than 0.02% Si, not more than 0.50% Mn, not more than 0.008% N, 0.003 to 0.08% sol. A1, 0.0020 to 0.0050% B with the balance being Fe and unavoidable impurities, in which 2.7 [N%] ≦ (A1 + B) ≦ 20 [N%], the ratio of B/N is less than 1.0 and wherein the sheet has a grain size number not larger than No. 9 of ASTM.

3,988,175

SOLDERING FLUX AND METHOD

James C. Baker, Coopersburg, and Robert E. Bauer, Allentown, both of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Aug. 23, 1974, Ser. No. 499,959

Int. Cl.² B23K *35/34*

U.S. Cl. 148—26 **15 Claims**

1. A reaction flux for use in soldering aluminum and aluminum alloy sheets and strip and metallic coated ferrous sheet and strip selected from the group of metallic coatings consisting of aluminum, alloys of aluminum, and aluminum-zinc, consisting essentially of a mixture, by weight, of 10 to 14 parts stannous chloride, 0.25 to 1.5 parts ammonium chloride, and 0.05 to 0.3 parts sodium fluoride.

3,988,176
ALLOY FOR MOLD

Seizo Watanabe; Koji Kitazawa; Minoru Maeda, and Masaru Yamaguchi, all of Osaka, Japan, assignors to Hitachi Shipbuilding and Engineering Co., Ltd., Osaka, Japan

Filed July 26, 1974, Ser. No. 492,311
Claims priority, application Japan, Aug. 4, 1973, 48-87820; Aug. 22, 1973, 48-94032
Int. Cl.[2] C22C *9/02, 9/06, 9/10;* B22D *13/10*
U.S. Cl. 148—32 **1 Claim**

1. A mold for continuous casting made of a copper alloy having been subjected to 15 – 40% of cold working, the thermal conductivity of the alloy being 40 to 75% of that of pure copper, the alloy consisting of copper as main constituent, 0.18 to 0.4% by weight of tin, 0 to 0.22% of magnesium, 0.3 to 0.7% of silicon, 0.45 to 2.5% of nickel, 0.02 to 0.15% of silver and 0.02 to 0.15% of lithium, and having a softening temperature and high-temperature strength of the numerical values given by the formulas (1) and (2)

$$T \geqq 1400C\,\lambda^{-A} \quad (1)$$

$$S \geqq 274C\,\lambda^{-B} \quad (2)$$

wherein A = 0.1 to 0.9, B = 0.2 to 1.0, C = 0.5 to 3, T is the softening temperature (°C) required of the mold material, S is the high-temperature strength (kg/mm²) required of the mold material, and λ is the thermal conductivity (%) of the mold when the thermal conductivity of a pure copper mold is assumed to be 100%, each of A, B and C being constant to be determined in accordance with the construction of the mold, operation conditions, and the like.

3,988,177
METHOD OF PRODUCING COLD ROLLED, SILICON-ALLOYED ELECTRIC SHEETS

Karl Ecker, Leonding; Ingeborg Richter, and Max Mayrhofer, both of Linz, all of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Oct. 21, 1974, Ser. No. 516,142
Claims priority, application Austria, Nov. 5, 1973, 9270/73
Int. Cl.[2] H01F *1/04*
U.S. Cl. 148—111 **4 Claims**

1. In a method of producing a cold rolled, non-oriented grain, silicon-alloyed electrical steel sheet with a watt loss, $V_{10/50}$, of less than 2.3 watt/kp from an unkilled mild steel melt having a carbon content of 0.03 to 0.06% by weight, which melt has its carbon content reduced to less than 0.02% by weight by vacuum decarburization and to which melt for deoxidation first aluminum and subsequently silicon are added, whereupon the melt is cast to form a slab, said slab being heated in a continuous furnace to a certain temperature and then hot rolled and subsequently cold rolled to form a strip or sheet that has its carbon content further reduced to less than 0.005% by weight by decarburizing and recrystallizing annealing the sheet in a continuous furnace, wherein the improvement comprises the steps of:

setting a manganese content of 0.25 to 0.80% by weight in the vacuum decarburized melt,

maintaining the slab temperature *t*, measured in °C prior to drawing the slab from the continuous furnace and before hot rolling, in dependence upon the manganese content in percent by weight at a value lying below a limit temperature given by the equation

$$t = \frac{-14{,}480}{\log Mn - 9.20} - 273,$$

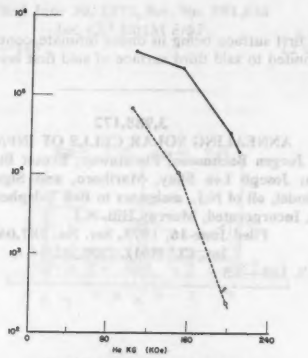
carrying out hot rolling while maintaining a final rolling temperature lying above 840° C, and

carrying out the decarburizing and recrystallizing annealing of the cold rolled strip or sheet over a period of not more than 4 minutes, wherein the carbon content is reduced to less than 0.003% by weight.

3,988,178
METHOD FOR PREPARING SUPERCONDUCTORS

Shelley D. Dahlgren, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Nov. 29, 1974, Ser. No. 528,382
Int. Cl.[2] C22F *1/18;* C23C *15/00*
U.S. Cl. 148—133 **8 Claims**



$Nb_3Al_{0.75}Ge_{0.25}$ superconductor sputtered on a substrate cooled to 20° C and heat treated 6 days at 750°C.

$Nb_3Al_{0.75}Ge_{0.25}$ composite of the best reported results for compounds sputter-deposited on heated substrates.

1. A method for preparing a superconductor having an equiaxial fine-grain beta-tungsten structure comprising:

a. sputtering superconductive material selected from the group consisting of Nb_3Al, $Nb_3Al_{0.75}Ge_{0.25}$, Nb_3Ga, Nb_3Sn and V_3Ga, under a partial pressure of inert gas onto a substrate selected from the group consisting of copper, stainless steel, niobium and tungsten, cooled to and maintained from about 10 to 20° C. to deposit a layer of superconductive material thereon, said deposit having generally a body-centered-cubic type crystal structure, and

b. heating the deposit of superconductive material to from 550° to 950° C. for a period of time sufficient to transform the body-centered-cubic type crystal structure into an equiaxial fine-grain beta-tungsten structure having superconductive properties.

3,988,179
METHOD AND APPARATUS FOR INDUCTIVELY HEATING ELONGATED WORKPIECES

Anthony F. Del Paggio, and Norbert R. Balzer, both of Parma, Ohio, assignors to Park-Ohio Industries, Inc., Cleveland, Ohio

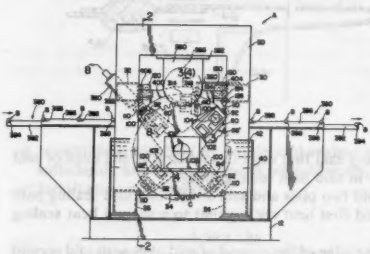
Filed Jan. 9, 1975, Ser. No. 539,926
Int. Cl.[2] C21D *1/66, 1/42;* H05B *5/00*
U.S. Cl. 148—153 **26 Claims**

1. A device for inductively heating an elongated workpiece having a central axis, said device comprising a fixed elongated inductor including a loop formed from two generally parallel conductors and two longitudinally spaced generally semi-cir-

cular cross-over conductors, said inductor having an open side defined by said two generally parallel conductors; and turret means for moving said workpiece toward and away from said inductor in an arcuate path extending into said open side and in a direction transverse to said central axis of said workpiece, said movement being between a first position with said workpiece in magnetic coupling with said inductor and between said parallel conductors and a second position on said arcuate path and spaced substantially from said inductor, said turret means including two axially spaced center means defining an axis generally parallel to said central axis for rotatably supporting said workpiece therebetween and means for rotating said workpiece between said center means.

21. A method of heating elongated workpieces each having a central axis and a cylindrical body portion, said method comprising the following steps:

a. providing an inductor having a given length and including an elongated heating chamber with an open side;



b. providing a workpiece supporting station including two workpiece support elements spaced in a direction parallel to said elongated heating chamber a distance greater than said given length;
c. moving said station in a first direction on an arcuate path intersecting said heating chamber and past said inductor with said elements clearing said inductor;
d. loading a workpiece onto said station between said elements;
e. moving said station in a second direction opposite to said first direction on said path to a position with said workpiece passing through said open side and into said heating chamber;
f. rotating said workpiece on said station;
g. energizing said inductor with an alternating current; and,
h. moving said station in said first direction along said path and from said heating chamber.

3,988,180

METHOD FOR INCREASING THE MECHANICAL FEATURES AND THE RESISTANCE AGAINST CORROSION UNDER TENSION OF HEAT-TREATED ALUMINUM ALLOYS

Jean Marie Amedee Bouvaist, Grenoble, France, assignor to Societe de Vente de l'Aluminium Pechiney, Paris, France

Filed Dec. 23, 1974, Ser. No. 535,740
Claims priority, application France, Jan. 7, 1974, 74.00399
Int. Cl.² C22F *1/04*
U.S. Cl. 148—159 **6 Claims**

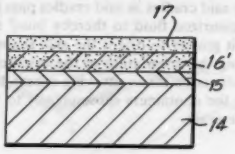
1. A process for improving the mechanical properties and resistance to stress corrosion of wrought heat treated aluminum alloys containing one or more hardening elements selected from the group consisting of Cu, Mg, Si, Zn, Ag and Li in which at least one of said elements is present in the alloy in an amount sufficient to at least saturate the solid solution at the eutectic melting temperature T_e, the amount in the alloy of hydrogen capable of being released in gaseous form, during the solution heat treatment being less than 0.1 ppm, in which process the alloy is subjected to a solution heat treatment, before quenching, at a temperature [T_1 such that $T_0 < T_1 < T_1$]T_1 such that $T_0 < T_1 < T_1$ (T_1 being the incipient melting temperature under conditions of thermodynamic equilibrium) and over a period such that the metastable liquid phases initially formed are substantially completely resorbed, so that after a short holding time the alloy becomes solid, and quenching and aging said heat treated alloy.

3,988,181

METHOD OF DOPING A POLYCRYSTALLINE SILICON LAYER

Fukashi Imai, Okaya, and Yukio Morozumi, Chino, both of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed May 30, 1973, Ser. No. 365,371
Claims priority, application Japan, June 7, 1972, 47-55993
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975
Int. Cl. H01L *21/225*
U.S. Cl. 148—188 **7 Claims**



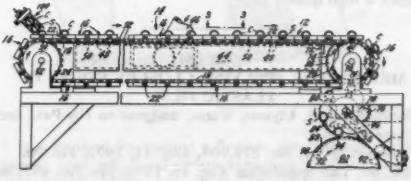
1. In a method for fabricating a wafer type semiconductor wherein an insulating layer and doped polycrystalline silicon layer are successively deposited on a semiconductor substrate, the improvement comprising depositing an insulating film layer of predetermined thickness on said semiconductor substrate, said insulating film completely overlying the deposition surface of said semiconductor substrate, depositing a substantially pure polycrystalline silicon layer of predetermined thickness on said insulating film layer, thereafter depositing a doped oxide film layer of predetermined thickness on said substantially pure polycrystalline silicon layer by heat treating said layered substrate in a carrier stream having a make-up of dopant to SiH_4 in a ratio of 100 parts to 1 part by volume, and thermally treating said layered wafer to initiate dopant diffusion into said substantially pure polycrystalline silicon layer, whereby a high resistance semiconductor device with an accuracy of ±20 percent to specification is formed.

3,988,182

SIDE SEAM ORIENTATION IN CAN LABELING MACHINE

Patrick Francis Urso, Crystal Lake; Earl Roger Van Alsburg, Barrington, and Walter Joseph Sieverin, Buffalo Grove, all of Ill., assignors to American Can Company, Greenwich, Conn.

Continuation of Ser. No. 318,887, Dec. 27, 1972, abandoned.
This application Oct. 31, 1974, Ser. No. 519,737
Int. Cl.² B65C *3/12*: B65G *47/24*
U.S. Cl. 156—60 **11 Claims**



8. A method of orienting cylindrically shaped magnetically attractable containers having a side seam in each which is horizontally positioned and parallel to the longitudinal axis of the container so that an operation can be performed on the container utilizing the side seams, comprising:

a. serially feeding said containers at a first station to cradles serially positioned on a means for conveying the containers to a second station, said cradles comprising upper and lower plates, said upper plate having a longitudinal opening therein for horizontally cradling the cylindrically shaped container so that a longitudinal portion of the sidewall extends therein and said lower plate having a pair of openings therein each disposed on opposite sides of the longitudinal opening in the upper plate;

b. serially conveying said containers carried by said cradles from said first station to said second station;

c. providing a chamber of pressurized fluid beneath said cradles on said conveying means intermediate said first and second stations;

d. direction a sufficient volume of pressurized fluid from said chamber through the openings in said cradles upwardly and on opposing sides of the longitudinal axis of the containers to contact the undersides of the containers carried by said cradles as said cradles pass over the chamber of pressurized fluid to thereby buoy said containers and permit gravity to orient the side seams thereof; and

e. maintaining the orientation of the oriented side seam of said containers on said conveying means by magnetically attracting the containers subsequently to the orientation of the side seam.

3,988,183

VARIATION OF BINDER CONTENT IN THE CORE LAYER

Siegfried Senn, Zurich, Switzerland, assignor to Fahrni Institute Ltd., Zurich, Switzerland

Filed Nov. 10, 1970, Ser. No. 88,519

Claims priority, application Switzerland, Nov. 24, 1969, 17434/69

Int. Cl.² B29J *5/02;* **B32B** *5/16*

U.S. Cl. 156—62.8 **10 Claims**

1. Method for the production of single layer or multilayer panels which comprises preparing a core zone of wood chips mixed with a thermosetting binder, superimposing on both sides of said core zone intermediate zones of wood chips mixed with quantities of said binder, the amount of binder in said core zone being greater than the amount of binder in said intermediate zones based on the weight of said chips in the respective zones, and wherein outer core zones of wood chips and binder are superimposed along said intermediate zones, and wherein the amount of binder used in said outer core zones is less than the amount used in said intermediate zones based on the weight of the wood chips, the amount of binder, by weight, used in said core zone is about 4% to 8%, wherein the amount of binder used in said intermediate zones is about 3% to 7%, wherein the amount of binder used in said outer core zones is about 2% to 6%, and wherein the amount of binder in said core zone is always about 1% to 2% greater than the amount of binder in said intermediate zones, and wherein the amount of binder in said intermediate zones is always about 1% to 2% greater than the amount of binder in said outer core zones, and thereafter hot pressing said zones to produce a high quality panel.

3,988,184

METHOD FOR APPLYING CLOSURE STRIPS TO PLASTIC FILM

H. Keith Howard, Ulysses, Kans., assignor to Uly-Pak, Inc., Ulysses, Kans.

Division of Ser. No. 279,905, Aug. 11, 1972, Pat. No. 3,846,209. This application Aug. 15, 1974, Ser. No. 497,584

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² A41H *37/00;* **A44B** *19/00*

U.S. Cl. 156—66 **23 Claims**

1. A method of continuously sealing the longitudinal edges of a strip of heat-weldable material to the corresponding longitudinal edges of two contiguous plies of heat-weldable material comprising the steps of

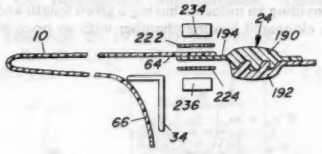
aligning said two plies of material in a generally horizontal plane to form an upper ply and a lower ply, the edge of said lower ply extending beyond the edge of said upper ply;

drawing said plies continuously along a sealing path;

aligning the edge of only a first one of said plies with a first heat sealing unit;

vertically aligning a first edge of said strip with the edge of said first ply;

continuously feeding said strip and first ply through said first heat sealing unit while guiding the second of said plies away from said first ply to bypass said first heat sealing unit;



heat-welding said first edge of said strip to the edge of said first ply in said heat sealing unit;

guiding said two plies and said strip along said sealing path from said first heat sealing unit to a second heat sealing unit;

aligning the edge of the second of said plies with said second heat sealing unit;

vertically aligning the second edge of said strip with the edge of said second ply;

continuously feeding said strip and said second ply through said second heat sealing unit; and

heat-welding said second edge of said strip to the edge of said second ply, whereby the longitudinal edges of said strip are sealed to the corresponding edges of said plies.

3,988,185

METHOD OF INDUCTION HEAT SEALING AN ASYMMETRICAL-SHAPED CLOSURE TO A TUBULAR BODY

Charles Louis Johnson, and Charles Donald Stuard, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 488,101, July 12, 1974, Pat. No. 3,892,351. This application Apr. 7, 1975, Ser. No. 565,903

Int. Cl.² B29C *27/00, 19/02;* **B23K** *13/02*

U.S. Cl. 156—69 **6 Claims**

1. A method of induction heat sealing an asymmetrical-shape closure to a tubular body having an outwardly rolled top rim with electrical insulation means disposed intermediate said closure and said rim, said closure comprising a disc portion and an integral radially extending tab, said tab being folded upwardly and radially inwardly so that it lies superjacent the top surface of said disc portion, said closure comprising an electrically conductive sheet, said body comprising an electrically conductive liner, said method comprising the steps of:

a. juxtapositioning said closure on said rim with said electrical insulation means disposed intermediate the bottom surface of the peripheral section of said disc portion and said rim,

b. biasing said peripheral section towards said rim with a uniformly distributed force,

c. simultaneously subjecting adjacent portions of said electrically conductive sheet, electrical insulation means, and said electrically conductive liner to a high frequency electrical field of sufficient constant intensity to independently inductively heat said adjacent portions of said

sheet and said liner to cause heat activatable sealant disposed intermediate said adjacent portions to be conductively heated to a sufficiently high bonding temperature to sealingly secure said adjacent portions together along a circumferentially extending seam,

d. terminating said field to enable said sealant to cool to a sufficiently low temperature to set said seam, and

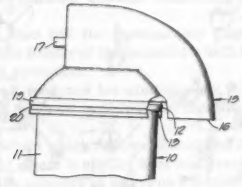
e. terminating said biasing.

3,988,186

AEROSOL SAFETY CAP PERMANENTLY WELDED TO CONTAINER

Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.

Filed Sept. 23, 1974, Ser. No. 508,365
Int. Cl.² B29C *27/02*
U.S. Cl. 156—69 **1 Claim**



1. The method of permanently securing a plastic safety cap upon the upper end of a cylindrical metal aerosol container having a circumferential bead thereon, which consists in placing a continuous plastic ring in tight engagement with the exterior surface of said container immediately beneath said bead, placing said plastic safety cap about said container so as to extend around and about both said bead and said ring, and thereafter welding the adjacent portion of said safety cap to said ring.

3,988,187

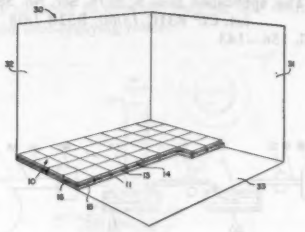
METHOD OF LAYING FLOOR TILE

Alvin E. Witt, and Homer Breault, both of Pine Glen, Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 330,159, Feb. 6, 1973, Pat. No. 3,902,293.
This application Apr. 28, 1975, Ser. No. 572,370
Int. Cl.² E04B *5/00*
U.S. Cl. 156—71 **1 Claim**

1. A method of applying attrition resistant flooring to an area which includes the steps of:

placing a plurality of tiles in a central area, each tile having a plurality of strata bonded to each other, there being overhanging-underfitting relationship of straight line boundary portions which in the unadhered condition permits two adjacent tiles to be slideably adjustable with respect to each other, whereby each tile has overhanging-underfitting relationship with four adjacent tiles, said tiles having boundary portions adapted for an underfitting relationship along two edges which meet at a corner, said tiles being adhered to each other only at the overhanging-underfitting zone, each of said overhanging portions comprising a straight line tongue fitting into a groove of an adjacent tile, the depth of the groove being less than the magnitude of said overhanging portion, whereby the tongue may be conveniently inserted in the groove at the



time of laying the floor there being a bottommost wafer board strata beneath the tongue strata;

trimming tiles at the periphery of the area; and

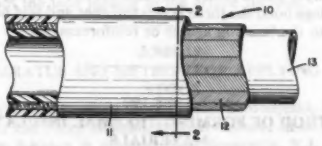
anchoring selected tiles at the periphery of the area to the sub-flooring while retaining vent paths for diffusion of moisture to permit the moisture content of the sub-flooring and the moisture content of the atmosphere to equilibriate readily in such central area because of not using conventional adhesive relationship of the floor tiles and sub-flooring throughout such central area, a gas permeation zone being maintained between the vertical walls of said bottommost strata of adjacent tiles, there being no adhesive between said vertical walls.

3,988,188

DIMENSIONALLY STABLE, FLEXIBLE HYDRAULIC HOSE HAVING IMPROVED CHEMICAL AND TEMPERATURE RESISTANCE

Hans A. Johansen, Mantua, and David D. Russell, Atwater, both of Ohio, assignors to Samuel Moore and Company, Aurora, Ohio

Division of Ser. No. 328,367, Jan. 3, 1973, Pat. No. 3,881,521.
This application Apr. 19, 1974, Ser. No. 462,386
Disclosure was also published under second Trial Voluntary Protest Program on Jan. 13, 1976
Int. Cl.² B29D *23/12, 23/04*
U.S. Cl. 156—143 **16 Claims**



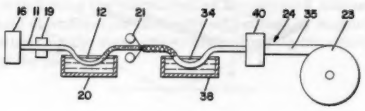
1. In a method for making a flexible, dimensionally stable hydraulic hose which comprises extruding a self-supporting elastomeric core tube, surrounding the core tube with reinforcing fibers and extruding an elastomeric sheath over the fibers, the improvement which comprises tautly winding biased overlapping reinforcing fibers uniformly over the surface of the core tube to provide a reinforcing layer which covers at least about 85% thereof, with the fibers wound about the core

tube in each direction forming an angle of from about 50° to about 65° with the longitudinal axis of the core tube whereby substantial expansion of the core tube under pressure at elevated temperatures is prevented, and irradiating the core tube with ionizing electrons until it is no longer thermoplastic and has improved solvent, chemical and heat resistance.

3,988,189
METHOD OF CONSTRUCTING A HOSE

Dennis W. Sullivan, Willoughby, Ohio, assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Continuation of Ser. No. 397,175, Sept. 14, 1973, abandoned.
This application June 5, 1975, Ser. No. 584,208
Int. Cl.² B31C *13/00*; **B32B** *1/08*
U.S. Cl. 156—143 **2 Claims**



1. The method of constructing a hose comprising in sequence as a continuous process the steps of extruding a core tube of synthetic rubber over a mandrel whereby the mandrel will control the inside diameter of the core tube throughout the remainder of the process, completely curing the core tube by application of heat to the core tube and mandrel, applying a bonding agent to the tube after the tube is completely cured, and applying a reinforcement over the tube in a manner to effect a bond of the core tube to the reinforcement via the bonding agent and whereby neither the bonding agent nor the reinforcement is subjected to said heat.

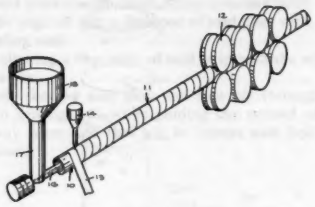
2. The method of constructing a hose comprising in sequence as a continuous process the steps of extruding a core tube of synthetic rubber over a mandrel whereby the mandrel will control the inside diameter of the core tube throughout the remainder of the process, completely curing the tube by application of heat to the tube and mandrel, applying a first coating of bonding agent to the exterior of the tube after the tube is completely cured, applying a first reinforcement layer of cotton braid over the tube to be adhered thereto by said bonding agent, applying a second reinforcement layer comprising stainless steel braid over the first layer, applying a second coating of bonding agent to the second layer so as to penetrate the interstices thereof to make contact with the first layer, and applying an upper layer of cotton braid over the second layer into contact with said second coating whereby the coatings bond the three layers together and said heat is not applied to the bonding agents or reinforcement.

3,988,190
METHOD OF FORMING THERMAL INSULATION MATERIALS

Joseph Anthony McWilliams, Kidderminster, England, assignor to Micropore Insulation Limited, Kidderminster, England

Filed Oct. 6, 1970, Ser. No. 78,487
Int. Cl.² A63B *39/00*, *41/00*; **B32B** *31/00*
U.S. Cl. 156—145 **5 Claims**

1. A method of forming thermal insulation material into a desired sectional shape, which method comprises injecting a quantity of free flowing thermal insulation material into a confining envelope of porous material sufficient to only partially fill said envelope, passing said envelope containing the insulation material between rollers so as to impart said desired

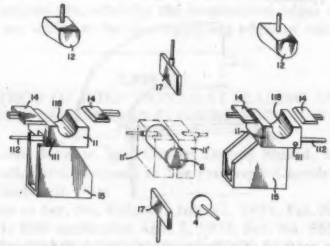


shape thereto and then treating the combined shaped envelope and insulation material to render the combination rigid.

3,988,191
PROCESS FOR PREPARING A VESSEL FROM THERMOPLASTIC RESIN PLATE

Takashi Matsui, Nara, Japan, assignor to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Japan

Filed Oct. 30, 1973, Ser. No. 411,078
Claims priority, application Japan, Nov. 7, 1972, 47-111755
Int. Cl.² B29D *23/10*
U.S. Cl. 156—218 **1 Claim**



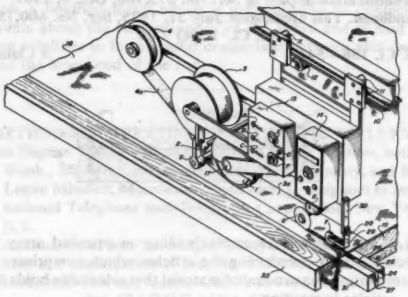
1. A process for preparing a thermoplastic resin vessel having a bottom portion and at least two side portions of hard thermoplastic resin, positioning a bottom mold and the major and remaining portions of a side mold away from an inner mold, placing the bottom portion on the bottom mold, bending each of said side portions along a concave surface of one of the major mold portions to form a curved portion, maintaining both edges of each of said curved portions in a softened state, applying the bottom portion to a forward surface of the inner mold by advancing the bottom mold carrying the bottom portion, moving the major mold portions carrying said curved portions to surround the inner mold, then inserting remaining mold portions of the side mold between said major mold portions around the inner mold, thus simultaneously adhering each of said softened edges to completely surround the inner mold to form a tube which holds the bottom portion therein, and removing the bottom mold and major portions and remaining portions of the side mold and the inner mold to obtain the vessel.

3,988,192

METHOD FOR TABLING DRAPERIES AND APPARATUS THEREFOR

Merrill Young Landis, 137 Third St., Telford, Pa. 18969, and Otto Lloy Hilgner, 1340 Fairground Road, Hatfield, Pa. 19440

Filed June 6, 1975, Ser. No. 584,605
Int. Cl.² B32B *31/18*
U.S. Cl. 156—267 11 Claims



11. A method of bonding crinoline to draperies which consists essentially of laying drapery material face down on a support comprising:

1. a flat surface;
2. a heating bar, integrally connected to the flat surface and serving as its operating edge, for the purpose of preheating that portion of the drapery material which is to undergo the bonding operation; and
3. clamping devices for maintaining the material in a stationary position; and

activating a joining machine to move across the edge of the material which is to undergo the crinoline-bonding step; wherein the machine consists essentially of the following elements:

1. a first feed roll for continuously dispensing crinoline along that border of the material which is to undergo the bonding operation;
2. a second feed roll for continuously interfeeding a dry adhesive filament between said crinoline and said material;
3. a heat wheel which follows behind and along the strip of crinoline where it applies heat and pressure sufficient to liquify the adhesive so as to join the crinoline and drapery material;
4. a preheater which precedes the heat wheel and which blows warm air over the surface of the crinoline prior to its contact with the adhesive;
5. a cutter means which follows the heat wheel in a slotted track where it cuts off the excess of the joined material and crinoline; and
6. a cutter guide which follows the cutter means in said slotted track.

3,988,193

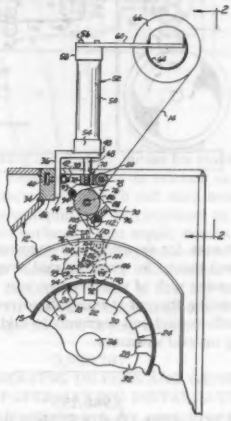
TAPING ATTACHMENT OR DEVICE

Cornelis G. Arens, 700 Haggerty Highway, West Bloomfield, Mich. 48033

Continuation-in-part of Ser. No. 316,987, Dec. 20, 1972, Pat. No. 3,832,876. This application Aug. 29, 1974, Ser. No. 501,648
Int. Cl.² B65C *9/18*
U.S. Cl. 156—446 3 Claims

1. A device for applying a band of adhesive tape to an article upon an article carrier wherein the taping device and the article carrier are moved relatively to one another while the device is applying the tape to the article, said device comprising

- a taping device support adapted to be mounted in proximity to the article carrier,
- a tape roll holder for an adhesive tape roll mounted on said support remote from the article carrier,
- a tape applicator carriage movably mounted on said support for travel relatively thereto toward and away from the article carrier,
- a rearward rotary tape guide roller mounted on and movable with said tape applicator carriage between said tape roll holder and the article carrier,
- a tape-applying roller rotatably mounted on a shaft on said tape applicator carriage between said rearward tape guide roller and the article carrier,
- a tape cutter holder pivotally mounted approximately midway between its opposite ends on said shaft coaxial with said tape-applying roller,



- an intermediate tape pressing roller rotatably mounted on said tape cutter holder between said rearward tape guide roller and said tape-applying roller,
- a tape cutter mounted on said tape cutter holder in forwardly spaced relationship to the pivotal mounting thereof,
- means for moving said tape applicator carriage toward and away from the article carrier and sequentially moving said tape-applying roller and said tape cutter into and out of tape-applying and tape-cutting engagement respectively with the tape adhering to the article on the article carrier,
- and a torsion spring interposed between said carriage and said shaft coaxial with the pivotal mounting of said cutter and urging said cutter holder and said tape cutter thereon toward the article carrier and into cutting engagement with the tape leading to the article thereon.

3,988,194

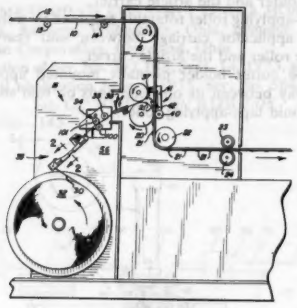
APPARATUS AND METHOD FOR APPLYING LABEL STOCK

Donald Babcock, Oak Lawn; Richard Modjeski, Evergreen Park, and Perry Holman, Downers Grove, all of Ill., assignors to Johnson & Johnson, New Brunswick, N.J.

Division of Ser. No. 387,577, Aug. 10, 1973, Pat. No. 3,897,293. This application Jan. 27, 1975, Ser. No. 544,550
Int. Cl.² B32B *31/10*
U.S. Cl. 156—459 14 Claims

1. Apparatus for providing adhesive tape tabs on a disposable diaper from a roll of a laminar assembly of a substrate material and a release sheet material held together by a layer of a tacky, pressure-sensitive adhesive which comprises: means for unwinding said roll and paying out said laminar assembly therefrom; means for separating an edge portion of

said release sheet from said laminar assembly at an unwound portion thereof, concave folding means for folding back said separated portion of said release sheet into an overlying relationship to an unseparated portion thereof to thereby expose a portion of said adhesive layer as an adhesive coating on said



substrate; means for severing end segments of said laminar assembly; and means for pressing said severed end segments against a moving web of water-impervious material at a marginal side portion thereof at intervals corresponding to diaper lengths to adhere said end segments to said web by said adhesive coating on said substrate.

3,988,195

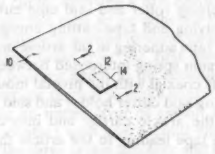
MACHINE FOR APPLYING A SEMIPERMEABLE PATCH ON A PLASTIC BAG

Harold E. Henderson, Tyler, Tex., assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Jan. 27, 1976, Ser. No. 652,677

Int. Cl.² B32B *31/00*; B30B *15/34*

U.S. Cl. 156—514 **5 Claims**



1. A machine for perforating a plastic sheet and securing a patch of the plastic sheet over said perforation comprise support means for holding the plastic sheet in position, cutting means located above said support means and movable downwardly to perforate the plastic sheet, heat-sealing means movably mounted below said support means for vertical movement upwardly into engagement with said plastic sheet and patch applying means movably mounted vertically above said heat-sealing means for moving said patch into engagement with said plastic sheet opposite said heat-sealing head and for pressing said patch and plastic sheet against said head, the axes of movement of said cutting means and said patch applying means intersecting at said support means.

3,988,196

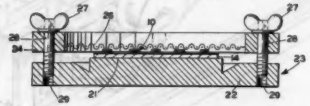
APPARATUS FOR TRANSFERRING AN ORIENTED ARRAY OF ARTICLES

William R. Wanesky, Wescosville, Pa., assignor to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 232,735, March 8, 1972, Pat. No. 3,899,379, which is a division of Ser. No. 64,898, July 30, 1970, Pat. No. 3,690,984, which is a division of Ser. No. 729,859, April 10, 1968, Pat. No. 3,632,074, which is a continuation-in-part of Ser. No. 673,900, Oct. 9, 1967, abandoned. This application July 31, 1975, Ser. No. 600,758

Int. Cl.² B23Q *7/00*

U.S. Cl. 156—541 **4 Claims**



1. Apparatus for releasably holding an oriented array of articles and for transferring the articles, which comprises:

a mounting constructed of material that releasably holds the articles in position;

a carrier for receiving the articles from the mounting, the carrier being constructed of material selected from the group consisting of silicone rubber and silicone resin, each of which exhibits pressure sensitive, vacuum holding properties of sufficient magnitude to hold the articles in the original orientation upon release of the articles from the mounting; and

means for abutting the carrier against the articles on the mounting and for separating the carrier and the mounting to effect a transfer of the articles to the carrier upon release of the articles by the mounting.

3,988,197

CRUCIBLE-FREE ZONE MELTING OF SEMICONDUCTOR CRYSTAL RODS INCLUDING OSCILLATION DAMPENING

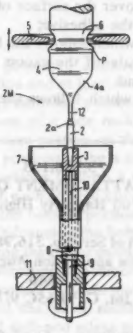
Wolfgang Keller, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Division of Ser. No. 525,641, Nov. 20, 1974, Pat. No. 3,923,468. This application May 27, 1975, Ser. No. 580,585

Claims priority, application Germany, Nov. 22, 1973, 2358300

Int. Cl.² B01J *17/10*

U.S. Cl. 156—620 **2 Claims**



1. In a method of crucible-free zone melt processing of a semiconductor crystal rod which is vertically mounted at opposite ends thereof and has a melt-connected seed crystal

at a lower end thereof and a melt zone passing upwardly from the juncture of the seed crystal through the rod, the improvement comprising uniformly supporting said lower end of said rod after it has resolidified so as to arrest any oscillations between said seed crystal and said rod, said uniform supporting of the lower end of said rod being accomplished by axially upwardly moving a hollow funnel-shaped support means from a position below said juncture between the seed crystal and the rod to a position surrounding the lower end of said rod; said support means comprising a funnel-shaped casing filled with a liquified metal which is self-adjusting to contact all points about the circumference of the lower end of said rod and solidifies to form a solid connection between said casing and the lower end of the rod.

3,988,198

METHOD FOR TREATING HEMI CAUSTIC EFFLUENTS

Jim Degnan Wilson, Olympia; Andrew Beelik, Shelton, both of Wash.; Herbert Lawrence Hergert, Morris County, and Reid Logan Mitchell, Morristown, both of N.J., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation of Ser. No. 365,517, May 31, 1973, abandoned, which is a continuation of Ser. No. 183,273, Sept. 23, 1971, abandoned. This application Oct. 7, 1974, Ser. No. 512,487

Int. Cl.[2] D21C *11/04*; C01D *1/36*

U.S. Cl. 162—30 R **6 Claims**

1. A process for treating spent hemicaustic effluent from a cold caustic extraction of cellulosic pulp containing about 0.5 to 3.0% hemicellulose and from about 4 to 24% sodium hydroxide to recover and reuse the caustic values therein, said process consisting essentially of heating said effluent to a temperature in the range of about 175°–200° C for a period of time sufficient to cause thermal degradation of hemicelluloses in said effluent whereby deposition of said hemicelluloses on cellulosic material upon use of said effluent is substantially eliminated, recovering said effluent and employing said effluent containing said degraded hemicellulose as a source of sodium hydroxide in subsequent pulp processing operations.

3,988,199

PERLITE INSULATION BOARD AND METHOD OF MAKING THE SAME

Roy Wayne Hillmer, Parker; Nicholas Francis Morrone, and Chester Robert Slahetka, both of Littleton, all of Colo., assignors to Johns-Manville Corporation, Denver, Colo.

Filed Jan. 27, 1975, Ser. No. 544,082

Int. Cl.[2] D21D *3/00*

U.S. Cl. 162—101 **25 Claims**

1. An insulation board, comprising:

a. expanded perlite, said perlite being the largest single ingredient, by dry weight, in the board;

b. gypsum, said gypsum being the second largest single ingredient, by dry weight, in the board;

c. organic fiber as a minor ingredient, by dry weight, in the board; and

d. binder as a second minor ingredient, by dry weight, in the board.

15. A method of making an insulation board, comprising:

a. forming an aqueous slurry including expanded perlite, gypsum, organic fiber and binder, with the exception of water the perlite being the largest single ingredient, by dry weight, in said slurry and said gypsum being the second largest single ingredient, by dry weight, in said slurry;

b. forming a continuous wet mat from said slurry;

c. draining the water from said wet mat and;

d. removing residual moisture from said drained mat.

16. A method according to claim 15 wherein said slurry includes between approximately 10% and 13% solids by dry weight, said method including:

mixing said slurry to entrap air bubbles so as to decrease the bulk density of the slurry prior to formation of said wet mat.

3,988,200

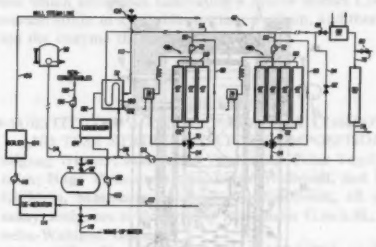
SYSTEM FOR HEAT-EXCHANGE OF HEAT TRANSFER LIQUID WITH STEAM IN PAPERMAKING INSTALLATIONS

Horace L. Smith, Jr., Richmond, Va., assignor to Smitherm Industries, Inc., Richmond, Va.

Continuation-in-part of Ser. No. 622,617, Oct. 15, 1975. This application Jan. 20, 1976, Ser. No. 650,780

Int. Cl.[2] D21F *5/06*

U.S. Cl. 162—290 **3 Claims**



1. In a papermaking installation: means for making a web of paper; web drying means which has an external surface that is adapted to be contacted by the web and, also, means through which a heat transfer liquid can be circulated to elevate the temperature of said surface; steam supply means; a heat exchanger means; means for circulating steam from said supply means and the heat transfer liquid in heat transfer relationship through said heat exchanger means to heat the heat transfer liquid; and means for thereafter circulating said heat transfer liquid to and through the web drying means.

3,988,201

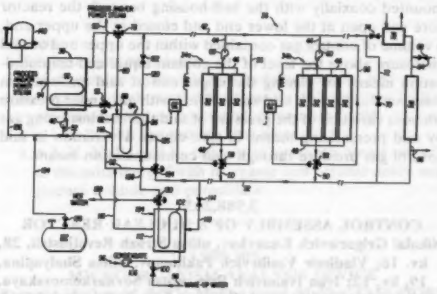
SYSTEM FOR HEATING DRYERS AND GENERATING STEAM IN PAPERMAKING INSTALLATIONS

Horace L. Smith, Jr., Richmond, Va., assignor to Smitherm Industries, Inc., Richmond, Va.

Continuation-in-part of Ser. No. 622,617, Oct. 15, 1975. This application Jan. 20, 1976, Ser. No. 650,778

Int. Cl.[2] D21F *5/06*

U.S. Cl. 162—290 **7 Claims**



1. A papermaking installation including: means for forming pulp into a web; means for drying the web comprising at least one dryer having an external surface over which the web can be passed to transfer heat from said dryer to said web and at least one circuit through which a heat transfer liquid can be circulated to raise the temperature of said surface; heat exchange means through which the liquid can be circulated; means for circulating the liquid through the dryer and through the heat exchange means; and means for circulating an aqueous fluid through said heat exchange means in heat transfer relationship with the liquid to generate steam for the installation.

3,988,202
NUCLEAR REACTOR OF PRESSURIZED LIQUID COOLANT TYPE

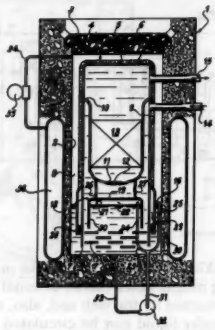
Didier Costes, Paris, France, assignor to Commissariat a l'Energie Atomique, Paris Cedex, France

Filed Mar. 22, 1974, Ser. No. 453,966

Claims priority, application France, Mar. 30, 1973, 73.11588

Int. Cl.² G21C *15/00*

U.S. Cl. 176—52 **9 Claims**



1. A pressurized liquid coolant nuclear reactor comprising a concrete pressure vessel having an internal wall and a vertical axis, a bell-housing having an open lower end and disposed coaxially with the interior of the pressure vessel so as to delimit therewith a space filled with gas under pressure for the thermal insulation of the internal wall of said vessel, a source for the thermal insulating gas, pressurizing means for placing said thermal insulating gas under pressure in said space, a pressurizing device for putting the coolant under pressure within the bell-housing, comprising a volume of control gas in contact with a large free surface of coolant in such a manner as to ensure that an appreciable variation in volume of liquid displaced within the coolant circuit inside the bell-housing corresponds to a small variation in pressure of said control gas, the pressurizing device further including an enclosure mounted coaxially with the bell-housing beneath the reactor core and open at the lower end and closed at the upper end, a volume of control gas contained within the upper end of said enclosure above the level of the coolant liquid and communication means for placing the upper end of said enclosure in communication with said space filled with gas under pressure wherein variation of the pressure of said thermal insulating gas by said pressurizing means in turn causes a variation in said control gas pressure through said communication means.

3,988,203
CONTROL ASSEMBLY OF A NUCLEAR REACTOR

Nikolai Grigorievich Kuzavkov, ulitsa Strazh Revoljustsii, 28, kv. 16; Vladimir Vasilievich Pakhomov, ulitsa Shalyapina, 19, kv. 12; Ivan Ivanovich Prin, ulitsa Sovnarkomovskaya, 30, kv. 106, and Alexandr Sergeevich Shabalin, ulitsa Strazh Revoljutsii 28, kv. 20, all of Gorky, U.S.S.R.

Filed May 10, 1974, Ser. No. 469,030

Claims priority, application U.S.S.R., May 14, 1973, 1916242

Int. Cl.² G21C *7/08*

U.S. Cl. 176—86 R **2 Claims**

1. In a nuclear reactor having a fuel core, a control assembly, and a coolant comprising: a guide sleeve fixedly mounted in said fuel core and having an inlet and an outlet for circulating coolant; a casing arranged coaxially in said guide sleeve and movable telescopically therein, and having an inlet and an outlet for circulating coolant; a space defined between said casing and said guide sleeve; two vertically superposed sections in said casing; fuel elements forming said first section; absorbing elements forming said second section; at least one opening in the casing approximately at the boundary between said sections, said opening providing for the removal of part of said coolant from said casing into said space between the casing and the guide sleeve; and throttle means on said casing in said space between the casing and the guide sleeve in the

zone of said second section formed by absorbing elements, said throttle means being movable with said casing, said throttle means providing full throttling when said throttle means is completely within said guide sleeve and providing less throttling when it is partially withdrawn from said guide sleeve into a region above said outlet said throttle means ensuring control of the flow of said coolant through said space depending on the position of said casing relative to said fuel core.

3,988,204
PRODUCTION OF GLUCOAMYLASE FOR CONVERSION OF GRAIN MASHES IN THE PRODUCTION OF GRAIN SPIRITS

Arthur A. Andreasen; Albert J. Bronsky, and Wendell L. Bruce, all of Louisville, Ky., assignors to Joseph E. Seagram & Sons, Inc., New York, N.Y.

Filed Oct. 31, 1974, Ser. No. 519,560

Int. Cl.² C12C *11/00*; C07G *7/028*

U.S. Cl. 195—15 **17 Claims**

1. A process for preparing grain alcohol, which comprises;

a. cooking a dispersion of cereal grains in water under a pressure of between about 50 to 120 psig and at a temperature within the range of from about 300° to about 350° F. to obtain a mash of high cereal grain content, said grain consisting essentially of 97 to 99 percent corn;

b. converting the mash obtained in step (a) above with a glucoamylase ferment produced by the propagation of the microorganism *A. awamori* NRRL 3112 on a mash obtained by cooking a grain dispersion consisting essentially of 97 to 99 percent corn, under a pressure of from 50 to 120 psig and at a temperature of from about 300° to about 350° F., said ferment being the product produced by the propagation fermentation of said organism on said mash to which there is added prior to propagation about 0.5 percent (w/v) of a compound selected from the group consisting of glutamic acid and monosodium glutamate;

c. inoculating the converted mash with fermentation yeast; and

d. fermenting the inoculated and converted mash for a sufficient period to produce grain alcohol.

11. A process for producing glucoamylase ferment, which comprises;

a. cooking a dispersion of cereal grains in water under a pressure of from about 50 to 120 psig and at a temperature of from 300° to 350° F. to obtain a mash of high

cereal grain content consisting essentially of from 97 to 99 percent corn;

b. inoculating the mash obtained with the microorganism *A. awamori* NRRL 3112; and

c. fermenting the inoculated mash for a period of time sufficiently long to produce a glucoamylase rich ferment.

3,988,205

OPTICALLY ACTIVE CYCLOHEXANE DERIVATIVES

Walter Boguth, Riehen; Hans Georg Wilhelm Leuenberger, Arlesheim; Hans Johann Mayer, Fullinsdorf; Erich Widmer, Munchenstein, and Reinhard Zell, Rodersdorf, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

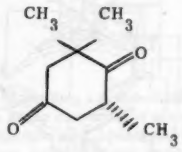
Filed Aug. 4, 1975, Ser. No. 601,770

Claims priority, application Switzerland, Aug. 21, 1974, 11434/74; Nov. 1, 1974, 14674/74; July 16, 1975, 9303/75

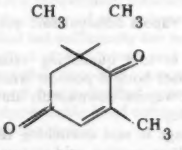
Int. Cl.² C12D *13/00*

U.S. Cl. 195—51 R 4 Claims

1. A process for producing optically active cyclohexane derivative of the formula



comprising subjecting a compound of the formula



to fermentation in an aqueous medium wherein the fermentation is carried out utilizing a microorganism capable of converting ketoisophorone to a [6R]-2,2,6-trimethyl-1,4-cyclohexanedione.

3,988,206

HEAT STABLE CYCLODEXTRIN GLYCOSYLTRANSFERASE

Makoto Shiosaka, Okayama, Japan, assignor to Hayashibara Biochemical Laboratories, Incorporated, Japan

Filed Sept. 23, 1974, Ser. No. 508,433

Claims priority, application Japan, Oct. 2, 1973, 48-110868

Int. Cl.² C07G *7/02*

U.S. Cl. 195—62 4 Claims

1. A cyclodextrin glycosyltransferase capable of converting starch to cyclodextrin and of transferring glucose from starch to sucrose, said cyclodextrin glycosyltransferase maintaining substantially 100% activity for 15 minutes at 65° C in an aqueous M/50 solution of Tris-HCl buffer at pH 7.0 in the absence of calcium chloride.

3,988,207

PREPARATION OF A MILK-COAGULATING ENZYME

Knud Aunstrup, Hvidovre, Denmark, assignor to Novo Terapeutisk Laboratorium A/S, Copenhagen, Denmark

Filed Nov. 21, 1966, Ser. No. 595,643

Claims priority, application United Kingdom, Dec. 2, 1965, 51270/65

Int. Cl.² C12D *13/10*

U.S. Cl. 195—62 7 Claims

1. A process for the preparation of a milk-coagulating enzyme which comprises cultivating a *Mucor miehei* Cooney et Emerson strain in a suitable nutrient medium, and then recovering the enzyme thereform.

3,988,208

9-SUBSTITUTED 3-AMINOCARBAZOLE COMPOUNDS AND TEST STRIP INDICATOR COMPOSITIONS

Wolfgang Werner, Mannheim-Vogelstang; Peter Vogel, Weinheim; Hugo Tiedemann, Mannheim-Wallstadt, and Werner Güthlein, Mannheim-Neckarau im Sennteich, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

Division of Ser. No. 487,338, July 10, 1974. This application Mar. 17, 1975, Ser. No. 559,273

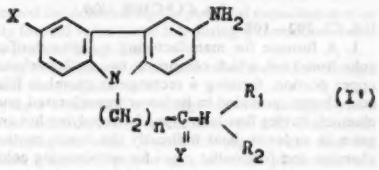
Claims priority, application Germany, Aug. 1, 1973, 2338932

The portion of the term of this patent subsequent to July 2, 1991, has been disclaimed.

Int. Cl.² C12K *1/04*

U.S. Cl. 195—103.5 C 15 Claims

1. Diagnostic test composition for enzymatic determination of glucose containing a 9-substituted 3-aminocarbazole compound of the formula:



(I')

wherein

X is hydrogen or halogen,

Y is oxygen or represents two hydrogen atoms; and

R_1 and R_2, which can be the same or different, are hydrogen, lower alkyl or hydroxyalkyl or amino; and

n is 1 or 2, with the proviso that when

n is 2, X, Y, R_1 and R_2 cannot be hydrogen atoms, as well as the salts thereof with inorganic and organic acids, and glucose oxidase and peroxidase.

3,988,209

MICROORGANISM ANALYSIS DEVICE

Bernard McDonald, 24826 Malibu Road, Malibu, Calif. 90265

Division of Ser. No. 363,383, May 24, 1973, Pat. No. 3,894,845. This application Apr. 17, 1975, Ser. No. 569,058

Int. Cl.² C12K *1/04*

U.S. Cl. 195—139 11 Claims

1. A laboratory device for performing urinalysis comprising:

a housing;

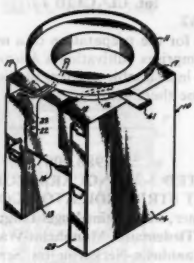
a collection compartment in the housing for receiving urine;

a plurality of separate test compartments in the housing isolated from the collection compartment so that urine cannot flow directly from the collection compartment to the test compartments;

nutrient means in each test compartment for growth of microorganisms;

wick means between the collection compartment and the respective test compartments for transferring a limited quantity of urine from the collection compartment to the nutrient means in the test compartments;

an overflow reservoir for receiving urine in excess of the amount needed to fill the collection compartment and



overflow means between the collection compartment and the reservoir for conducting urine to the overflow reservoir when a predetermined quantity has entered the collection compartment.

3,988,210

FURNACE FOR MANUFACTURING HIGH CALORIFIC GAS AND COKE FROM COAL

Jerzy Pikoń; Piotr Wasilewski, both of Gliwice, and Bolesław Mitka, Katowice, all of Poland, assignors to Politechnika Slaska im Wincentego Pstrowskiego, Gliwice, Poland

Filed Feb. 28, 1975, Ser. No. 554,214

Int. Cl.² C10B *1/00*

U.S. Cl. 202—108 **2 Claims**

1. A furnace for manufacturing a high-calorific gas and coke from coal, which comprises: two walls perforated in the upper portion, forming a rectangular chamber filled with a coal charge, provided in its lower imperforated portion with channels having first inlet pipes for supplying hot combustion gases in order to heat indirectly the lower portion of said chamber and first outlet pipes for withdrawing cold combustion gases to the atmosphere, said furnace being provided in its upper zone with second inlet pipes for delivering coal to the furnace and ramming pistons having imparted free reciprocating motion, said furnace also being provided at the side in its upper perforated portion with third inlet pipes for supplying hot circulating gas as the direct heating means to the upper perforated portion of said rectangular chamber and with second outlet pipes disposed within the gas chamber defined by the outer surface of the inner walls of said rectangular chamber for withdrawing cold circulating gas to a blower and thence to a heat exchanger for reheating the cold circulating gas and means for supplying said reheated circulating gas to said third inlet pipe.

3,988,211

APPARATUS FOR QUENCHING COKE PUSHED FROM COKE OVENS

Hugo Lewandowski, and Gerd Friedrich Fautz, both of Essen, Germany, assignors to Heinrich Koppers Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Oct. 9, 1974, Ser. No. 513,280

Claims priority, application Germany, Oct. 18, 1973, 2352296

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 20, 1976

Int. Cl.² C10B *39/08, 39/12*

U.S. Cl. 202—227 **7 Claims**

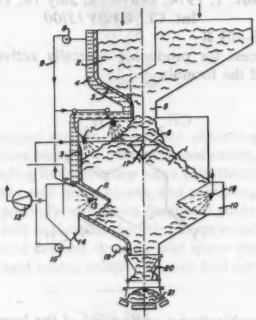
1. Apparatus for quenching incandescent coke pushed from a coke oven comprising,

a quenching vessel having a top portion with an inlet opening and a bottom portion with an outlet opening,

valve means in said bottom opening to control the flow of quenched coke therethrough and provide a bed of quenched coke in said quenching vessel,

a collector vessel having a bottom outlet opening connected to said quenching vessel top inlet opening, said collector vessel arranged to receive incandescent coke pushed from a coke oven and introduce said incandescent coke at a predetermined rate into said quenching vessel,

first water spray means positioned in said quenching vessel adjacent said top portion, said first water spray means arranged to quench said incandescent coke and form



quench water vapors adjacent said quenching vessel top portion,

suction means in said quenching vessel adjacent said quenching vessel bottom portion arranged to draw said quench water vapors downwardly through said bed of quenched coke,

an annular passage in said quenching vessel adjacent said quenching bottom portion, said suction means connected to said annular passage and arranged to draw said quenched water vapors into said annular passage, and

second water spray means positioned in said annular passage and arranged to precipitate particulate matter in said quenched water vapors.

3,988,212

POLYMERIZATION INHIBITOR FOR VINYL AROMATIC COMPOUNDS

James M. Watson, Big Spring, Tex., assignor to Cosden Technology, Inc., Big Spring, Tex.

Filed Mar. 21, 1975, Ser. No. 560,349

Int. Cl.² B01D *3/34*

U.S. Cl. 203—9 **12 Claims**

1. A process for the distillation of a readily polymerizable vinyl aromatic compound, which comprises subjecting said compound to distillation conditions in a distillation system under vacuum distillation conditions and adding to said system a polymerization inhibitor consisting essentially of a mixture of N-nitroso diphenyl amine and a dinitro-o-cresol, wherein said mixture contains 10 to 90% by weight of N-nitroso diphenyl amine with the remainder being a dinitro-o-cresol and wherein said inhibitor is used in an amount of 50 to 3000 ppm by weight of said vinyl aromatic compound.

3,988,213

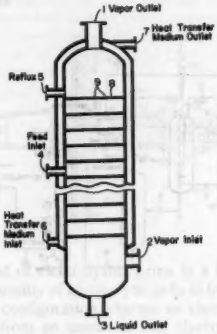
METHOD OF DISTILLING VINYL COMPOUNDS

Sadao Yoshida, Suita; Kunihiro Kubota, Takatsuki; Daizo Kobayashi, Osaka; Noboru Shimizu, Ibaraki, and Takashi Ohara, Nishinomiya, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 291,598, Sept. 25, 1972, abandoned. This application Oct. 1, 1974, Ser. No. 510,917

Int. Cl.[2] B01D 3/34; C07C 7/18

U.S. Cl. 203—9 3 Claims



1. In a method of distilling a polymerizable vinyl compound selected from the group consisting of acrolein, methacrolein, acrylic acid, methacrylic acid, hydroxyethyl acrylate, hydroxyethyl methacrylate, hydroxypropyl acrylate, hydroxypropyl methacrylate, glycidyl acrylate and glycidyl methacrylate, by distilling said polymerizable vinyl compound in contact with a polymerization inhibitor for said polymerizable vinyl compound in a distillation tower having perforated trays, the improvement comprising heating the tower to maintain the inner wall thereof at a temperature sufficiently high to prevent condensation of the vapor of the polymerizable vinyl compound being distilled but sufficiently low so as not to diminish the rectification effect of said tower, said temperature being within 30° C. higher than that of the vapor of said polymerizable vinyl compound being distilled, whereby formation of polymer of the polymerizable vinyl compound being distilled is prevented during distillation.

3,988,214

METHOD OF FABRICATING A SEMICONDUCTOR DEVICE

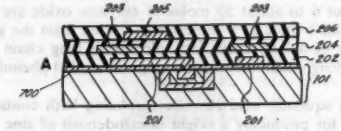
Hideo Tsunemitsu, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed June 13, 1969, Ser. No. 833,095

Claims priority, application Japan, June 17, 1968, 43-41769; Dec. 28, 1968, 44-925

Int. Cl.[2] C25D 5/02; B01J 17/00; H01L 23/30

U.S. Cl. 204—15 16 Claims



1. A method of manufacturing a semiconductor device including a lead-out wiring structure comprising the steps of;

preparing a semiconductor substrate including at least one circuit component therein and covered with an insulative film at the surface thereof, said insulative film having at least one opening formed therein,

depositing a conductive metal film on said semiconductor substrate, said conductive metal film being electrically connected to said semiconductor substrate through said opening in said insulative film, and

selectively anode-oxidizing said conductive metal film by applying an electrical voltage between said semiconductor substrate with said conductive metal film and an anode forming solution to form conductive channels in said conductive metal film, said conductive channels being isolated from one another by the resulting oxide of the metal of said conductive metal film.

3,988,215

METHOD FOR RECORDING POTENTIAL CAPACITY OF A FORMED FOIL IN A CONTINUOUS FOIL FORMING PROCESS

Albert E. Scherr, III, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Continuation-in-part of Ser. No. 434,715, Jan. 18, 1974, abandoned. This application May 8, 1975, Ser. No. 575,847

Int. Cl.[2] C25D 7/00, 11/00

U.S. Cl. 204—28 15 Claims

1. A method for determining the potential capacitance of an electrically formed valve-metal foil during a continuous oxide formation process comprising:

a. drawing continuously an etched valve metal foil through a liquid electrolyte;

b. applying a constant d.c. voltage between said foil and a counterelectrode that is in contact with said electrolyte;

c. maintaining the total current flowing between said foil and said counterelectrode at a constant predetermined value by varying the speed of said drawing; and

d. recording said speed and its corresponding location along said foil to establish the potential capacitance for each region along said foil.

2. The method of claim 1 wherein said recording is accomplished by

a. driving the paper in a strip chart recorder at a speed proportional to said foil drawing speed; and

b. continuously moving the pen of said strip recorder on said paper a lateral distance that is proportional to said speed, so that the inked line on said paper has a lateral displacement in each region of said paper proportional to the capacitance of each corresponding region of said foil.

3,988,216

METHOD OF PRODUCING METAL STRIP HAVING A GALVANIZED COATING ON ONE SIDE WHILE PREVENTING THE FORMATION OF A ZINC DEPOSIT ON CATHODE MEANS

Lowell W. Austin; Edwin J. Smith, and Leslie D. McGraw, all of Weirton, W. Va., assignors to National Steel Corporation, Pittsburgh, Pa.

Filed Oct. 15, 1975, Ser. No. 622,624

Int. Cl.[2] C25D 3/22, 7/06, 5/02

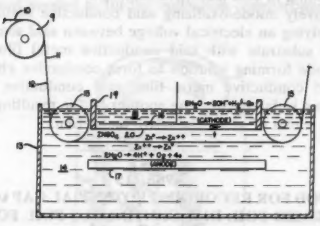
U.S. Cl. 204—28 32 Claims

1. A method for treating zinc-coated metal strip material comprising:

a. immersing the strip in an electrolyte solution,

b. passing the strip through the electrolyte solution and between anode means and cathode means,

c. electrolytically removing a zinc coating from the side of the strip facing the cathode means while simultaneously



depositing a substantially equivalent amount of zinc on the opposite side of the strip, and

d. preventing the formation of a zinc deposit on the cathode means.

3,988,217

PROCESS FOR PRODUCING A PROTECTIVE FILM ON AN ALUMINUM SURFACE

Masashi Ikegaya, Shizuoka, Japan, assignor to Riken Light-metal Industry Co., Ltd., Japan

Division of Ser. No. 300,159, Oct. 24, 1972, Pat. No. 3,909,371. This application Mar. 10, 1975, Ser. No. 556,975

Claims priority, application Japan, Oct. 22, 1971, 46-83339

Int. Cl.² C25D *5/44, 13/06*

U.S. Cl. 204—33 **7 Claims**

1. A process for coating an aluminum or aluminum alloy surface which comprises: degreasing, cleaning and water-rinsing the surface; etching the water-rinsed surface with an alkaline solution; neutralizing and water-washing the etched surface; and treating the surface as the anode for 5 – 30 minutes with DC 40 – 60 volts and a current density of 0.01 – 1 A/dm² at a bath temperature of 50° – 90° C. in an aqueous electrolyte containing 1.0 – 15.0 weight per cent of at least one compound soluble under the experimental conditions in the aqueous solution selected from the group consisting of aliphatic primary amines and aliphatic secondary amines and 20.0 – 50.0 weight per cent of at least one water-soluble thermosetting resin to form a resin coating, allowing the thus treated and coated surface to set; and drying and hardening the same at a temperature of 150° – 200° C. over a period of 15 – 30 minutes.

3,988,218

PROCESS FOR RECOVERING ALKYL SULFONIC ACID FROM PHOTOSULFOXIDATION REACTION MIXTURE

Rinnosuke Susuki, Tokyo; Sadao Toyoda, Funabashi, and Keiji Endo, Tokyo, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 70,306, Sept. 8, 1970. This application Dec. 29, 1972, Ser. No. 319,319

Claims priority, application Japan, Sept. 11, 1969, 44-72136

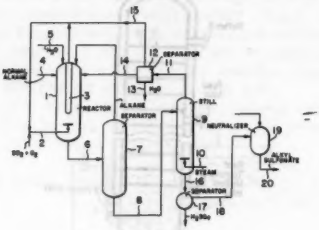
Int. Cl.² B01D *3/10*

U.S. Cl. 203—39 **4 Claims**

1. A process for recovering a purified reaction product comprised predominantly of alkyl sulfonic acid, from a reaction mixture obtained by photosulfoxidation of an alkane having a carbon atom number in the range of from 10 to 26, said reaction mixture containing SO_2, H_2SO_4, alkyl sulfonic acid, unreacted alkane and water, which process comprises the steps of:

1. separating, by settling, the reaction mixture into an upper layer (*a*) of the unreacted alkane and a lower layer (*b*) consisting of the remainder of the reaction mixture;

2. feeding lower layer (*b*) into a distillation vessel and feeding steam directly into the charge of (*b*) in the distillation vessel to effect distillation of said charge at a temperature in the range of from 80° to 250° C and a pressure in the range of from 50 to 760 mmHg and thereby obtaining a distillate fraction (*c*) containing substantially all the remaining unreacted alkane, substantially all the SO_2 and water, and a bottom fraction (*d*);



3. separating, by settling and without supplying further heat, fraction (*d*) into a lower layer (*e*) of a concentrated aqueous solution of H_2SO_4 and an upper layer (*f*) comprised predominantly of alkyl sulfonic acid, constituting the purified reaction product.

3,988,219

BATHS AND ADDITIVES FOR THE ELECTRODEPOSITION OF BRIGHT ZINC

William E. Rosenberg, Strongsville, Ohio, assignor to Columbia Chemical Corporation, Cleveland, Ohio

Filed July 7, 1975, Ser. No. 593,310

Int. Cl.² C25D *3/22*

U.S. Cl. 204—55 R **28 Claims**

1. A zinc brightener additive for an aqueous, acid zinc electroplating bath, comprising, an aminated polyepichlorohydrin, said polyepichlorohydrin prepared by reacting polyepichlorohydrin with an amine selected from the group consisting of secondary aliphatic amines and secondary alicyclic amines at a temperature of from about 110° C to about 170° C, the amount of said amines is such so that between 50 percent to 100 percent of the chloro groups in said polyepichlorohydrin is reacted, and from about 1 to about 99 percent by weight of an ethylene oxide condensation product wherein from about 6 to about 30 moles of ethylene oxide are condensed with 1 mole of a compound selected from the group consisting of a long chain fatty alcohol, a long chain fatty amine, a long chain fatty acid, a long chain alkyl phenol, and naphthol.

12. An aqueous, acid zinc electroplating bath containing zinc ions for producing a bright electrodeposit of zinc comprising, having dissolved therein from about 1 to about 10 grams/liter of aminated polyepichlorohydrin, from about 1 to about 10 grams/liter of an ethylene oxide condensation product, and about 0.05 to about 0.5 grams/liter of at least one compound selected from the group consisting of aromatic aldehyde and aromatic ketone.

3,988,220

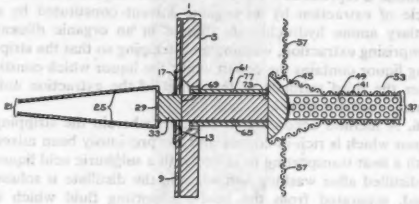
PROCESS FOR ELECTROLYZING BRINE IN A BIPOLAR ELECTROLYTIC DIAPHRAGM CELL HAVING FRICTION WELDED CONDUCTOR CONNECTOR MEANS

Leslie Gunby, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 430,977, Jan. 4, 1974, Pat. No. 3,900,384, which is a division of Ser. No. 309,310, Nov. 24, 1972, Pat. No. 3,813,326. This application Jan. 29, 1975, Ser. No. 544,987

Int. Cl.² C25B 1/16, 1/26, 11/10, 9/00

U.S. Cl. 204—98 5 Claims



1. In a method of electrolyzing brine in a bipolar electrolyzer having a plurality of electrolytic cells in bipolar electrical and mechanical configuration wherein an electrical current is caused to pass from an anode of one electrolytic cell to a cathode of said cell, and from said cathode through a backplate to an anode of the next adjacent cell in the electrolyzer, the improvement wherein the electrical current flowing from said cathode to said anode flows through a conductor passing through said backplate, said conductor comprising:

a copper stud;

a catholyte-resistant steel member friction welded to one end of said copper stud; and

an anolyte-resistant titanium member friction welded to the opposite end of said copper stud, the bond between said anolyte-resistant member and said copper stud having an electrical conductivity of greater than about 1.5×10^4 mho and having substantially no third phase between the copper stud and the anolyte-resistant member.

3,988,221

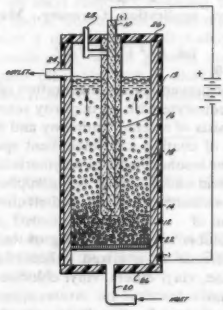
ELECTROLYTIC REMOVAL OF HEAVY METAL IONS USING PARTICULATE SILICON ALLOYS

Donald E. Garrett, and James P. McKaveney, both of Claremont, Calif., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed Mar. 20, 1975, Ser. No. 560,302

Int. Cl.² C25C 1/12, 1/06, 7/02

U.S. Cl. 204—105 R 17 Claims



1. In a process for removing ionic metals from aqueous solutions wherein the aqueous solution is subjected to direct electric current in the presence of at least one anode and a particulate cathode resulting in electrodeposition of the metal on the cathode, the improvement which comprises using as the particulate cathode a conductive silicon-metal alloy containing up to about 65 percent by weight silicon based on the total weight of the alloy, said alloy being essentially passive with respect to ionic displacement with the ionic metal contained in the aqueous solution and substantially inert with respect to the action of oxidizing acids used to remove electrodeposited metals from the surface of the alloy.

3,988,222

METHOD OF FABRICATION OF ELECTROEMISSIVE COMPONENTS

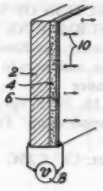
Jacques Emile Dubois; Pierre Camille Lacaze, both of Paris; Claude Le Gressus, Fontenay le Fleury, and Daniel Massignon, Paris, all of France, assignors to Commissariat a l'Energie Atomique, Paris and Agence Nationale de Valorisation de la Rocharche (ANVAR), Neuilly, both of, France

Division of Ser. No. 435,666, Jan. 23, 1974, Pat. No. 3,921,031. This application Jan. 21, 1975, Ser. No. 542,776

Claims priority, application France, Jan. 30, 1973, 73.03212

Int. Cl.² C25D 5/48; C23C 15/00; C25D 3/02

U.S. Cl. 204—38 S 12 Claims



1. A method of fabrication of an electroemissive component comprising:

preparing a solution consisting of an organic solvent in which is dissolved a salt of an alkali metal or an alkaline earth metal,

immersing a conductive substrate in said solution,

applying to said substrate a voltage of the same order of magnitude at absolute value as the discharge voltage of said alkali metal or alkaline earth metal in solution, thereby causing an electrochemical reduction reaction at the surface of the substrate and causing the formation of a film on said substrate,

withdrawing the substrate which is coated with said film from the solution, and

applying a thin conductive deposit to said film.

3,988,223

UNPLUGGING OF ELECTROLYSIS DIAPHRAGMS

Stanley T. Hirozawa, Birmingham, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Oct. 28, 1975, Ser. No. 626,488

Int. Cl.² C25B 1/16, 1/26, 15/08, 13/00

U.S. Cl. 204—98 7 Claims

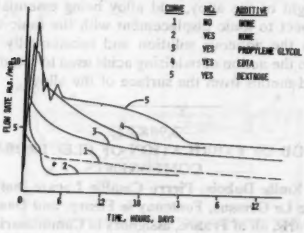
1. A method for unplugging a diaphragm in a chlor-alkali cell, comprising:

a. maximizing the head of the brine feed,

b. adding a chelate or a chelate former to the anolyte, the chelate being selected from the group consisting of compounds having an - or -hydroxyl carboxylic group and the chelate former being selected from the group consisting of

1. a compound which exists, under acid hydrolysis as a compound having one or more hydroxyl groups adjacent to an aldo- or keto- group and

2. a compound which can form, under acid hydrolysis, a compound having one or more hydroxyl groups adjacent to an aldo- or keto- group,



c. shunting the cell current, either before contemporaneous with or after the addition of the chelate or chelate former to reduce the current in the cell to about five to ten percent of normal operating current,

d. flushing the cell, and

e. removing the shunt.

3,988,224

METHOD OF EXTRACTION OF METALLIC ELEMENTS FROM SUBMARINE NODULES

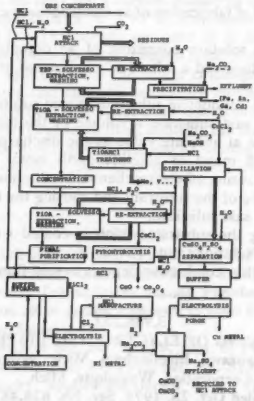
Jacques Barriere, Fontenay-aux-Roses, and Michéle Robaglia, Orsay, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 16, 1975, Ser. No. 641,238

Claims priority, application France, Dec. 18, 1974, 74.41838

Int. Cl.² C25C 1/12

U.S. Cl. 204—108 **17 Claims**



1. A method of extraction of metallic elements from manganiferous ores and more particularly from submarine nodules in which the ore is roasted in a controlled reducing atmosphere, cooled in an inert atmosphere, leached in a number of countercurrent stages by means of a mixture of ammonia and aerated ammonium carbonate in a concentration ratio such as to obtain a buffered pH value of the solution which is distilled by steam entrainment thereby causing precipitation of the carbonates, wherein the concentrate obtained is attacked by hydrochloric acid, the resultant hydrochloric acid leach solution is subjected to a first cycle of extraction by an organic solvent selected from tributylphosphate and a secondary amine diluted in an organic diluent comprising extraction, washing and stripping so that the stripping liquor contains iron, zinc, cadmium and gallium whilst the liquor constituted by the first raffinate at the outlet of the extraction unit mainly contains nickel, cobalt and copper, the hydrochloric liquor of the first raffinate is subjected to a second cycle of extraction by an organic solvent constituted by a tertiary amine hydrochlorate diluted in an organic diluent comprising extraction, washing and then stripping so that the stripping liquor contains copper while the liquor which constitutes the second raffinate at the outlet of the extraction unit mainly contains cobalt and nickel, the hydrochloric acid liquor of the second raffinate is reprocessed, concentrated and subjected to a third cycle of extraction by an organic solvent constituted by a tertiary amine hydrochlorate diluted in an organic diluent comprising extraction, washing and stripping so that the stripping liquor contains the cobalt whilst the liquor which constitutes the third raffinate at the outlet of the extraction unit mainly contains nickel.

6. A method according to claim **1**, wherein the stripping liquor which is rich in copper and has previously been mixed with a heat-transporting fluid and with a sulphuric acid liquor is distilled after washing and wherein the distillate is solubilized, separated from the heat-transporting fluid which is recycled to the distillation whilst the copper sulphate which has formed is subjected to electrolysis.

11. A method according to claim **1**, wherein the raffinate from the extraction of the cobalt which contains nickel chloride and certain impurities is subjected to extraction by the nickel salt of di-(2-ethylhexyl) phosphoric acid diluted in an organic diluent in the presence of a heavy alcohol in order to separate the nickel and magnesium chlorides which are sent into a buffer store from which is carried out the electrolysis which produces the nickel and the chlorine.

3,988,225

METHOD OF PREVENTING THE SUPERSATURATION OF ELECTROLYTE SOLUTIONS WITH ONE OR MORE OF THE IMPURITIES ARSENIC, ANTIMONY AND BISMUTH, IN THE ELECTROLYTIC REFINING OF NONFERROUS METALS, ESPECIALLY COPPER

Reinhold Schulze, Seevetal, Germany, assignor to Norddeutsche Affinerie, Hamburg, Germany

Continuation-in-part of Ser. No. 352,079, April 17, 1973, Pat. No. 3,887,448. This application May 12, 1975, Ser. No. 576,256

Claims priority, application Germany, May 13, 1974, 2422973

Int. Cl.² C25C 1/22

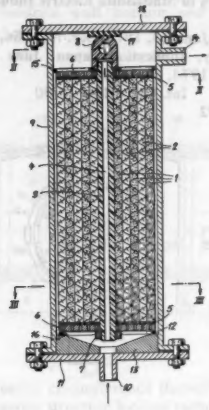
U.S. Cl. 204—130 **9 Claims**

1. A process for preventing supersaturation of a nonferrous metal refining electrolyte with an impurity selected from the group which consists of arsenic, antimony and bismuth, comprising the steps of coating a chemisorbent specific for said impurity in a water-insoluble acrylic polymerisate binder upon a flat substrate, said chemisorbent being applied to said substrate which is resistant to attack by said electrolyte in a solution or suspension of

a. a water-insoluble binder consisting of an acrylate ester pure polymerisate or a mixed polymerisate with vinyl esters, styrene, vinyl ethers, vinyl chloride or vinylidene chlorides; and

b. a flocculating agent for the chemisorbent selected from the group which consists of polyacrylates, polyacrylic esters, acrylic esters, acrylic ester mix polymerisates, polyacrylamides and polyethylene imines;

forming said substrate into a stack with additional layers of chemisorbent-coated substrate and enclosing said stack



in a reaction vessel; and passing said electrolyte through said stack.

3,988,226

PROCESS FOR THE PREPARATION OF PHOSPHONATED N,N-DISUBSTITUTED FATTY AMIDES

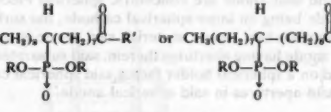
Robert R. Mod, New Orleans; James A. Harris, Pearl River; Jett C. Arthur, Jr.; Frank C. Magne, both of Metairie; Gene Sumrell, New Orleans, and Arthur F. Novak, Baton Rouge, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 335,860, Feb. 26, 1973, Pat. No. 3,911,120. This application July 10, 1975, Ser. No. 594,894

Int. Cl.² B01J 1/10

U.S. Cl. 204—158 HE **1 Claim**

1. A process for preparing a compound represented by the formula



wherein R is an alkyl radical containing from one to four carbon atoms, and R′ contains an amide nitrogen which may be derived from a dialkylamine, alkyl-alkoxyalkylamine or nitrogen heteroalicyclic, which process comprises reacting N,N-disubstituted oleamide with a dialkyl phosphite using gamma radiation from cobalt-60 to initiate free radical reaction.

3,988,227

OIL-RESISTANT EPDM ELASTOMER

Roger J. Eldred, Detroit, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 28, 1975, Ser. No. 572,976

Int. Cl.² C08F 8/00; C08K 5/54; C08L 23/16

U.S. Cl. 204—159.17 **3 Claims**

1. A high temperature, oil resistant elastomer having an equilibrium volume swell fraction, v_2, in toluene of from about one-fourth to about one-half produced by subjecting a uniform mixture to from 10 to 30 Mrads of high energy ionizing radiation, said mixture comprising by weight from about 5 to about 40 parts of a polymerizable acrylic cross-linking monomer having two or more points of ethylenic unsaturation and from about 15 to 80 parts of a reinforcing filler and about 100 parts of an uncured ethylene-propylene-diene monomer elastomer.

3,988,228

PHOTOPOLYMERIZABLE POLYMERIC COMPOSITIONS CONTAINING HALOGEN CONTAINING AROMATIC KETONES

Gordon C. Newland; Charles A. Kelly, and James G. Pacifici, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 29, 1975, Ser. No. 609,124

Int. Cl.² C08F 2/46, 4/00

U.S. Cl. 204—159.23 **18 Claims**

1. A composition capable of forming coatings hardenable by ultraviolet radiation comprising a mixture of a photopolymerizable or photocrosslinkable ethylenically unsaturated compound and from 0.01 to 10% by weight of a photoinitiator selected from the group consisting of aryl ketone compounds having the formula

wherein R_1 and R_2 are $-CH_2X$, $-CHX_2$ and $-CX_3$, where X is chlorine and bromine, and n is an integer of 1 to 5.

3,988,229

STABILIZED PHOTOPOLYMERIZABLE POLYMERIC COMPOSITIONS CONTAINING A PHOTOINITIATOR AND A NITRONE DERIVATIVE

James G. Pacifici, and Gordon C. Newland, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,812

Int. Cl.² C08F 2/46, 4/00

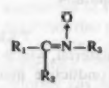
U.S. Cl. 204—159.23 **8 Claims**

1. A stabilized radiation-curable coating composition comprising:

a. at least one ethylenically unsaturated compound,

b. at least one photoinitiator, and

c. from about 0.001 to about 0.3 weight percent of a nitrone having the formula:



wherein R_1 is aryl or substituted aryl; R_2 is H, alkyl, cycloalkyl, araaltyl, aryl or substituted aryl; and

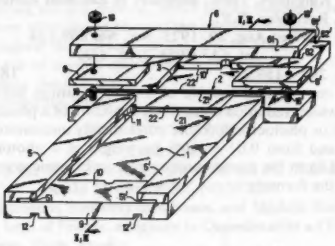
R_3 is tertiary alkyl or aryl.

3,988,230

CHAMBER AND PROCESS FOR CROSSED IMMUNOELECTRO-PHORESIS

Walter Krotz, Hamburg, Germany, assignor to Medac Gesellschaft fur klinische Spezial praparate mbH, Hamburg, Germany

Division of Ser. No. 536,964, Dec. 27, 1974, Pat. No. 3,964,992. This application Mar. 25, 1976, Ser. No. 670,165
Claims priority, application Germany, Dec. 31, 1973, 2365284; Oct. 11, 1974, 2448552
Int. Cl.² G01N 27/26
U.S. Cl. 204—180 G 13 Claims



1. A process for performing crossed-electrophoresis comprising the steps of:

a. subjecting a protein sample in a first carrier containing the protein sample to disc or flat disc electrophoresis,

b. placing the so subjected first carrier in the depot of a chamber, said chamber including a base plate having a well therein, the depot separating the well into a migration well and a connecting well, and means being provided for defining a vertically variable gap in the depot,

c. placing a second carrier distinct from said first carrier in the migration well of the chamber so that the first and second carriers are in contact with one another through the gap,

d. subjecting said second carrier in said chamber to electroimmunomigration, whereby migration of protein from said sample in said first carrier into said second carrier takes place.

3,988,231

METHOD FOR COATING A CONDUCTIVE MATERIAL

Hisao Kato, Neyagawa; Hideo Yagi, Kyoto, and Shunji Fukuta, Takatsuki, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed July 9, 1974, Ser. No. 486,834
Int. Cl.² C25D 13/20
U.S. Cl. 204—181 7 Claims

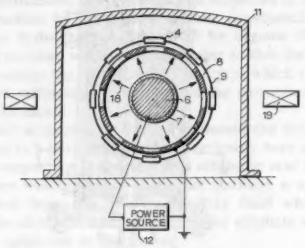
1. A method for coating a conductive material, which consists essentially of physically coating a conductive material with an inorganic composition containing at least one silicic acid base material to form an inorganic coating layer and then applying thereto an oganic elctrodepositable composition by electrophoretic means to form an organic coating layer.

3,988,232

METHOD OF MAKING CRYSTAL FILMS

Kiyotaka Wasa, Nara; Kenzo Ohji, Hirakata; Osamu Yamazaki, Suita, and Shigeru Hayakawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed June 13, 1975, Ser. No. 586,754
Claims priority, application Japan, June 25, 1974, 49-73057; June 27, 1974, 49-74108
Int. Cl.² C23C 15/00
U.S. Cl. 204—192 13 Claims



1. In a method of making crystal films by simultaneously depositing said crystal films on a plurality of substrates by cathodic sputtering of a source material onto said substrates, the improvement comprising sputtering the source material from a surface of said source material which is in the form of a convex curved surface or a polyhedral surface and positioning said substrates so as to face said surface of said source material, the substrates being at a distance from the source material with the ratio of the distance between said substrates and said surface of said source material to the radius of the curvature of the surface of said source material having the form of the convex curved surface or to a radius of the envelope of the polyhedral surface of said source material having the form of the polyhedral surface being in the range of 0.4 to 20, said substrates being positioned on a substrate holder facing and spaced from an anode having apertures therein and wherein said sputtering step is effected by the cathodic sputtering of a source material comprising a cathode onto said substrate through the apertures of said anode.

3. The improvement as claimed in claim 1, wherein said cathode and said anode are concentric spherical electrodes, said cathode being an inner spherical cathode, the surface of which comprises said source material, said anode is an outer spherical anode having apertures therein, said substrates being positioned on a spherical holder facing said spherical cathode through said apertures in said spherical anode.

3,988,233

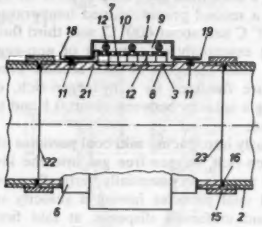
APPARATUS FOR MEASURING DISSOLVED GASES IN A FLUID MEDIUM

Gerold Gamer, and Gangolf Bräunlich, both of Heidelberg, Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Continuation of Ser. No. 429,855, Jan. 2, 1974, abandoned. This application May 7, 1975, Ser. No. 575,152
Claims priority, application Germany, Jan. 5, 1973, 2300417
Int. Cl.² G01N 27/46
U.S. Cl. 204—195 P 6 Claims

1. Apparatus for polarographically measuring dissolved gases in a liquid which comprises a cylindrical pipe line through which the liquid to be measured is flowed, a cylindrical polarographic measuring cell in said pipe line, said cell comprising a cylindrical tubular member which includes a wall portion intermediate the ends thereof made of a material enabling the dissolved gases in the liquid to diffuse therethrough but being impermeable with respect to the liquid,

means including a sheath surrounding said gas-diffusible intermediate wall portion of said tubular member in radial spaced relation to establish an annular electrolyte-filled chamber, a cathode structure applied to the outer periphery of said gas-diffusible intermediate wall portion and which extends



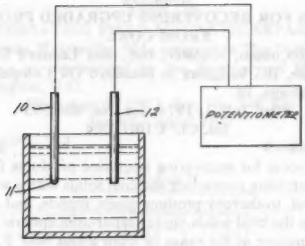
throughout the entire circumference thereof, a circumferentially extending anode structure located radially outward from said cathode structure and a circumferentially extending support for said anode located intermediate said cathode and anode and which is permeable to the electrolyte.

3,988,234

SODIUM SPECIFIC GLASS ELECTRODES

Chung Chang Young, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Oct. 3, 1974, Ser. No. 511,720
Int. Cl.[2] G01N 27/36
U.S. Cl. 204—195 G **2 Claims**



1. In an electrode having a glass sensing membrane the improvement wherein said sensing membrane is selectively responsive to sodium ions in an ionic mixture containing sodium and other monovalent cations and has a composition consisting essentially of:

Component	Mole %
Na_2O	5–25%
Al_2O_3	0–20%
Ta_2O_5	1–10%
SiO_2	60–82%

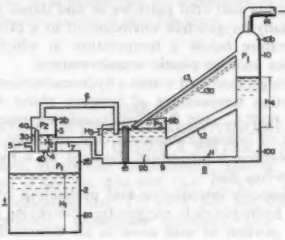
wherein $\frac{Ta_2O_5 + Al_2O_3}{Na_2O} > 0.2$.

3,988,235

VERTICAL DIAPHRAGM TYPE ELECTROLYTIC APPARATUS FOR CAUSTIC SODA PRODUCTION

Hiroshi Shibata; Isao Okazaki, and Yoshikazu Kokubu, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 16, 1975, Ser. No. 596,447
Claims priority, application Japan, July 26, 1974, 49-85644; July 30, 1974, 49-87140
Int. Cl.[2] C25B 1/26, 15/08
U.S. Cl. 204—266 **10 Claims**



1. A vertical diaphragm type electrolytic apparatus for caustic soda production, comprising:

a vertical diaphragm type electrolytic cell having an anode chamber including an anolyte space and a chlorine gas accumulating space above said anolyte space;

a primary brine-chlorine gas separating vessel disposed on said electrolytic cell and provided with a chlorine gas accumulating upper space connected to the chlorine gas accumulating space of the anode chamber through a chlorine gas flow-up pipe connected therebetween, a brine accumulating lower space having a brine reflex pipe of suitable diameter fitted to the bottom of said primary separating vessel so as to keep the level of brine accumulated in said space substantially constant, and a raw brine inlet pipe communicating with said brine accumulating lower space;

a chlorine gas-flow pipe;

a brine-flow pipe;

a secondary brine-chlorine gas separating vessel connected to said primary separating vessel and including a chlorine gas accumulating upper space connected to the chlorine gas accumulating upper space of said primary separating vessel through said chlorine gas-flow pipe, and a brine accumulating lower space connected to the brine accumulating lower space of said primary separating vessel through said brine-flow pipe, the forward end portion of said chlorine gas-flow pipe being dipped into the phase of brine accumulated in the secondary separating vessel;

at least one obliquely rising chlorine gas flush pipe;

at least one further brine-flow pipe; and

a tertiary tower type brine-chlorine gas separating vessel connected to the secondary separating vessel and including a chlorine gas accumulating upper space connected to the chlorine gas accumulating space of the secondary separating vessel through said at least one obliquely rising chlorine gas flush pipe, a brine accumulating lower space connected to the brine accumulating lower space of the secondary separating vessel through said at least one further brine-flow pipe, and a chlorine gas outlet provided at the top of the tertiary separating vessel.

3,988,236

PROCESS FOR THE CONTINUOUS HYDROCARBONIZATION OF COAL

Charles William Albright, South Charleston, and Hubert Greenidge Davis, Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 830,839, June 5, 1969, which is a continuation-in-part of Ser. No. 376,415, June 19, 1964, abandoned. This application Dec. 27, 1974, Ser. No. 536,850

Int. Cl.[2] C10G *1/06*

U.S. Cl. 208—8 **20 Claims**

1. A process for the hydrocarbonization of coal particles employing a fluid-bed zone of hydrocarbonization comprising:

a. fluidizing coal particles with a non-oxidizing gas to form a dense phase;

b. pressurizing said particles with a hydrogen-rich gas;

c. preheating said coal particles in said dense phase in an essentially oxygen-free environment to a predetermined temperature below a temperature at which said coal particles undergo plastic transformation;

d. providing a fluid-bed within a hydrocarbonization zone at a reaction temperature of between about 480° C and about 600° C, said fluid-bed consisting essentially of a matrix of non-agglomerating coal and char particles at said reaction temperature fluidized by a hydrogenrich, oxygen-free gas;

e. continuously introducing said preheating coal particles and a hydrogen-rich, oxygen-free conveying gas into the lower portion of said zone in an essentially vertically upwards direction, said coal particles having a velocity sufficient to rapidly and uniformly disperse at said predetermined temperature, within said matrix, said velocity being greater than about 200 feet per second;

f. continuously reacting said coal particles in said zone with hydrogen in said zone at said reaction temperature to produce a product comprising a condensable vapor and solid char;

g. maintaining the solids in said zone for an average residence time of about 5 to about 60 minutes and said vapor for about 10 to about 250 seconds;

h. maintaining the average hydrogen partial pressure in said zone at about 100 p.s.i. to about 1200 p.s.i.; and

i. continuously withdrawing from said zone said product vapor and solids.

3,988,237

INTEGRATED COAL HYDROCARBONIZATION AND GASIFICATION OF CHAR

Hubert Greenidge Davis, Charleston; Charles William Albright, South Charleston; John Johnson Potter, Jr., St. Albans, and Carl Edwin Strick, Charleston, all of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 27, 1974, Ser. No. 536,791

Int. Cl.[2] C10G *1/06*

U.S. Cl. 208—8 **14 Claims**

1. In a process employing two separate and interconnected fluid-bed reaction zones, a first zone for gasification and a second zone for combustion of char particles; wherein in said first zone, char particles are gasified with stream at an elevated temperature and pressure between about 150 p.s.i. and about 1000 p.s.i. to produce modified char particles and a first hydrogen-rich gas product; wherein said second zone, said modified char particles from said first zone are burned with air at a temperature sufficient to produce tacky ash particles that accrete to larger ash particles; and wherein said larger ash particles from said second zone provide the heat required to effect the gasification reaction in said first zone by descending in said first zone and transferring their sensible heat to said char particles and said steam, the improvements which comprise providing the char particle feed for said gasification and combustion zones by the steps of:

a. fluidizing coal particles with a non-oxidizing gas to form a dense phase;

b. pressurizing said fluidized coal particles of step a with a hydrogen-rich gas;

c. preheating said coal particles in said dense phase in an essentially oxygen-free environment to a first predetermined temperature below a temperature at which said coal particles undergo plastic transformation.

d. providing a third fluid-bed reaction zone for hyrocarbonization at a second predetermined temperature between about 480° C and about 600° C, said third fluid-bed zone consisting essentially of a matrix of non-agglomerating coal and char particles at said second predetermined temperature fluidized by a hydrogen-rich, oxygen-free gas having a velocity between about 0.1 and about 2 feet per second;

e. continuously introducing said coal particles of step c and a hydrogen-rich, oxygen-free gas into the lower part of said third zone in an essentially vertically upwards direction, said coal particles having a velocity sufficient to rapidly and uniformly disperse, at said first predetermined temperature, within said matrix; said velocity being greater than about 200 feet per second.

f. continously providing said char particles for gasification in said first zone by reacting said coal particles of step *e* and a condensable vapor product, the hydrocarbonization being conducted at said second predetermined temperature, a hydrogen partial pressure of from about 100 p.s.i. to about 1200 p.s.i. and an average solids resident time of about 5 minutes to about 60 minutes;

g. continuously withdrawing said char particles at said reaction temperature and said condensable vapor product from said zone;

h. continuously introducing said char particles into said first zone for gasification with steam;

i. condensing the condensable vapor in said vapor product to recover a heavy oil boiling above about 200° C; and

j. separating a light oil boiling above about 30° C and a second hydrogen-rich gas product from said vapor product.

3,988,238

PROCESS FOR RECOVERING UPGRADED PRODUCTS FROM COAL

John D. McCollum, Munster, Ind., and Leonard M. Quick, Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed July 1, 1974, Ser. No. 484,593

Int. Cl.[2] C10G *1/04*

U.S. Cl. 208—9 **22 Claims**

1. A process for recovering upgraded products from coal solids, comprising contacting the coal solids with a water-containing fluid, to thereby produce gases, liquids, and upgraded solids from the coal solids, under super-atmospheric pressure, at a temperature in the range of from about 600° F. to about 900° F. in the absence of externally supplied hydrogen or other reducing gas, and in the presence of an externally supplied, sulfur-resistant catalyst, selected from the group consisting of at least one basic metal carbonate, basic metal hydroxide, transition metal oxide, oxide-forming transition metal salt, and combinations thereof, wherein said catalyst is present in a catalytically effective amount, wherein the transition metal in the oxide and salt is selected from the group consisting of a transition metal of Group IVB, VB, VIB, and VIIB of the Periodic Chart and the metal in the basic metal carbonate and hydroxide is selected from the group consisting of alkali metals, and wherein sufficient water is present in the water-containing fluid and said pressure is sufficiently high so that the water in the water-containing fluid has a density of at least 0.10 gram per milliliter and serves as an effective solvent for the liquids and gases produced from the coal solids; and lowering said temperature or pressure or both, to thereby make the

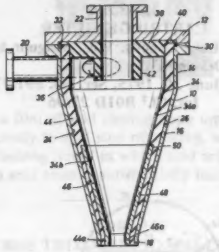
water in the water-containing fluid a less effective solvent for such liquids and gases and to thereby form separate phases.

3,988,239

CYCLONE AND LINE

Robert B. Malina, Pasadena, Tex., assignor to Picenco International, Inc., Houston, Tex.

Filed Aug. 19, 1974, Ser. No. 498,545
Int. Cl.² B04C 5/085
U.S. Cl. 209—211 20 Claims



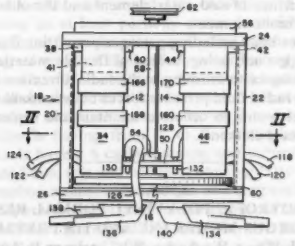
1. A liner for a cyclone comprising a body having a surface defining a longitudinal passageway through said body, said passageway including a generally conical section, said surface defining said passageway having a lesser wear portion and a greater wear portion, said liner body comprising a hollow bladder having an internal circumferential recess therein, and a generally tubular insert disposed in said recess and defining said greater wear portion of said surface, said recess and said insert having engaged side surfaces, said side surfaces having diameters decreasing in a direction extending longitudinally away from the larger end of the conical section of said passageway and toward the smaller end of the conical section of said passageway whereby said insert is restrained against longitudinal movement with respect to said bladder in the direction of decrease of said diameters.

3,988,240

ALTERNATING FIELD MAGNETIC SEPARATOR

Foster Fraas, Hyattsville, Md., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Apr. 5, 1973, Ser. No. 348,381
Int. Cl.² B03C 1/00
U.S. Cl. 209—214 14 Claims



1. Method of separately concentrating magnetic and nonmagnetic fractions of a stream of particles wherein said fractions are commingled, and from said stream are supplied particles thereof as feed to a fraction separation zone subject to the establishment therein of a magnetic flux field, comprising the steps of

conveying said feed by uniformly arranged, rigidly assembled, magnetically susceptible, flexibly supported transport means into said separation zone, and

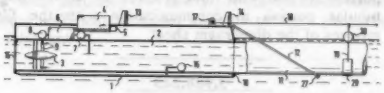
producing said magnetic flux field so as to continuously vary the intensity of said field in a regular cyclic manner such that said particles of said magnetic fraction are preferentially displaced in a substantially unidirectional path by intensification of said field, and said rigidly assembled, magnetically susceptible transport means immediately responds to the presence thereof in said varying magnetic flux field by undergoing constant vibrational thrusts including thrusts directionly coincidental with said unidirectional path when said particles of said magnetic fraction are preferentially displaced, whereby said preferential displacements of said magnetic particles are reinforced within a dispersement of said conveyed feed in said zone so as to enhance the completeness of said separate concentrations of said fractions.

3,988,241

FLOATING DEVICE FOR REMOVING REFUSE SITUATED ON AND UNDER A WATER SURFACE

Johann Rafael, Maxstrasse 36, Salzburg, Austria

Continuation of Ser. No. 404,908, Oct. 10, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 558,882
Claims priority, application Germany, Oct. 11, 1972, 2249898
Int. Cl.² B01D 21/00; E02B 15/04
U.S. Cl. 210—208 10 Claims



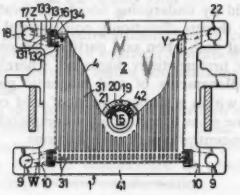
1. In combination with a body of water apparatus for purification of said body of water, said apparatus comprising a first floatable chamber constructed and arranged to be located at least partially beneath the surface of said body of water, inlet means located at a first end of said chamber and fluid pump means supported by said floatable chamber for introducing liquid with solid particles suspended therein from said body of water into said first chamber through said inlet, chemical flocculation means supported by said first chamber for introducing chemical flocculation agents into said first chamber, mixing means located in said first chamber for mixing chemical flocculation agents with the liquid in said chamber, elongate flexible duct means with a first end connected to an outlet in said chamber spaced apart from said inlet means, said flexible duct means being constructed and arranged to be of such a length for providing a residence zone for liquid introduced into said duct from said first chamber, a second inlet end of said duct connected to a second floatable chamber with a first end, said chamber being constructed and arranged to be located at least partially beneath the surface of said body of water, parallel plate separators located within said second chamber, outlet means located in a second end of said second chamber spaced apart from said inlet end whereby liquid introduced into said first chamber from the body of water by said pump means is returned to the body of water.

3,988,242

EXPRESSING FILTER PLATE FOR FILTER PRESS OF EXPRESSION TYPE

Tetsuya Kurita, Takarazuka, and Atsushi Kataoka, Toyonaka, both of Japan, assignors to Kurita Machinery Manufacturing Company, Osaka, Japan

Filed Apr. 27, 1976, Ser. No. 680,806
Int. Cl.² B01D *25/12*
U.S. Cl. 210—227 8 Claims



1. An expressing filter plate for a filter press of the expression type comprising:

a base plate,

a diaphragm sheet having a filter surface formed with filtrate grooves and covering the base plate with a pressure fluid chamber provided between the base plate and the diaphragm sheet for receiving a pressure fluid admitted through the base plate, the diaphragm sheet being formed in its peripheral portion to be clamped between pressed filter plates, with at least one fluid passing opening in communication with a fluid passage in the base plate, and

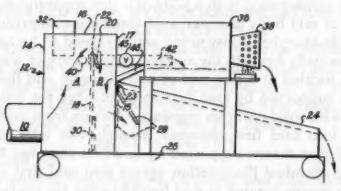
a covering member made of a material having higher hardness than the diaphragm sheet and including a tubular portion fitting in the fluid passing opening and a flange portion formed with fluid grooves for maintaining the tubular portion in communication with the filtrate grooves of the diaphragm sheet.

3,988,243

RISER BOX

Kenneth O. Huff, 200 Townsend Building, Casper, Wyo. 82601

Filed Sept. 30, 1974, Ser. No. 510,146
Int. Cl.² B01D *33/00*
U.S. Cl. 210—297 20 Claims



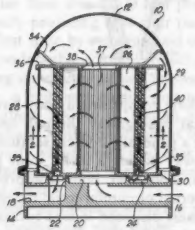
1. In a drilling mud handling system, a first housing enclosing a constant mud level control chamber and a second housing enclosing a mud distribution chamber each housing being mounted close to the other, a wall of said mud level control chamber near the mud distribution chamber being cut away and open to an adjustable distance below the top of said first housing defining a selected mud level therein and to provide a weir at an adjusted height over which the mud in the said mud lever control chamber overflows into the nearby second housing enclosing said mud level disposal chamber, said mud disposal chamber having a side opposite to the weir of said mud level control chamber open at a selected intermediate height below the weir level of said mud level control chamber, a mud treating means positioned to receive mud flowing over said weir and outward from said open intermediate height opening of said mud distribution chamber, and valve means below said opening of said mud disposal chamber controlling the flow of mud therethrough the alternate discharge and disposal of accumulated mud in said disposal chamber, means for passing drilling mud into said mud level control chamber and means communicating with the upper level of mud in said mud level control chamber fixed by the position of said weir for testing the quality of the mud in continuous flow through said mud level control chamber.

3,988,244

CARTRIDGE FILTER

Gary L. Brooks, Lake Geneva, Wis., assignor to Sta-Rite Industries, Inc., Delavan, Wis.

Filed June 30, 1975, Ser. No. 591,774
Int. Cl.² B01D *27/06*
U.S. Cl. 210—317 5 Claims



1. A fluid filter assembly comprising in combination:

a housing having an inlet and an outlet and defining a cavity communicating with said inlet;

a filter cartridge supported in said cavity;

said cartridge including inner and outer, concentric, generally cylindrical, flexible elements;

the inner surface of said inner element and the outer surface of said outer element being exposed to inlet fluid pressure within said cavity;

at least one of said inner and outer elements comprising a pleated filter;

said inner and outer elements being separated to define therebetween a generally cylindrical region communicating with said outlet;

and the improvement characterized by a generally cylindrical carrier body in said region sandwiched between the inner surface of said outer element and the outer surface of said inner element;

said carrier body including passages permitting fluid flow in said region and being formed of flexible material providing resistance to crushing in the radial direction for transmitting radial fluid pressure forces between said inner and outer elements in order to maintain the separation between said elements.

3,988,245

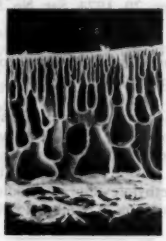
ANISOTROPIC POLYVINYL FORMAL RESIN MICROPOROUS MEMBRANE AND ITS PREPARATION

Donald G. J. Wang, Waukesha, Wis., assignor to Aqua-Chem, Inc., Milwaukee, Wis.

Continuation-in-part of Ser. No. 178,407, Sept. 7, 1971, abandoned. This application June 13, 1974, Ser. No. 478,848
Int. Cl.² B01D *31/00, 39/16;* B29D *27/04*
U.S. Cl. 210—500 M 18 Claims

1. A method for preparing microporous membranes consisting essentially of the steps of

a. preparing a casting dope consisting essentially of a polyvinyl formal resin dissolved in a solvent therefor,



b. casting a film of said casting dope upon a support; and
c. subsequently to said step of casting, immersing said film into a leaching liquid in which said solvent is soluble but in which said resin is substantially insoluble.

3,988,246

CLAY-FREE THIXOTROPIC WELLBORE FLUID

Arlynn H. Hartfiel, Houston, Tex., assignor to Chemical Additives Company, Houston, Tex.

Filed May 24, 1974, Ser. No. 472,982
Int. Cl.² C09K *7/02*
U.S. Cl. 252—8.5 A **5 Claims**

1. An aqueous clay-free, thixotropic wellbore fluid for use in subterranean formations in the earth comprising water, at least 1% by weight of a brine forming soluble salt or mixtures of salts, at least about 0.50 grams of MgO, 0.15 to 30 grams of hydroxypropyl ether starch and 0.72 to 7.14 grams of a heteropolysaccharide prepared by the action of bacteria of the genus Xanthomonas on carbohydrates.

3,988,247

SULFONATED LUBRICATING AGENTS FOR LEATHER AND FURS AND PROCESS

Gerhard Dieckelmann; Jürgen Plapper, both of Hilden; Horst Baumann, Leichlingen, and Werner Stein, Erkrath-Unterbach, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf, Germany

Filed Aug. 24, 1973, Ser. No. 391,201
Claims priority, application Germany, Sept. 14, 1972, 2245077
Int. Cl.² C14C *9/02*
U.S. Cl. 252—8.7 **6 Claims**

1. A process for the production of a sulfonated lubricating agent for leather and tanned furs consisting of the steps of: chlorinating an at least partially unsaturated fatty acid compound selected from the group consisting of esters of naturally occurring mixtures of higher fatty acids having from 8 to 24 carbon atoms with alcohols selected from the group consisting of alkanols having 1 to 24 carbon atoms, alkanediols having 2 to 6 carbon atoms, alkanetriols having 3 to 6 carbon atoms, alkanetetraols having from 4 to 6 carbon atoms and alkanehexaols having 6 carbon atoms, and naturally occurring unsaturated fats, oils and waxes containing fatty acids having 8 to 24 carbon atoms, with chlorine at a temperature of about room temperature until the double bonds in said fatty acid compounds are chlorinated and thereafter at a temperature of 40° to 100° C. under UV irradiation for a time sufficient to attain chlorine content of from 20 to 45% by weight, sulfonating said chlorinated fatty acid compound with SO_3 at a temperature of 80° to 85°C. for a time sufficient to attain an SO_3 content of from 40 to 150 mol percent based on the chlorinated fatty acid compound, and forming a water-emulsifiable alkali metal, ammonium, or lower alkyl-ammonium salt of said compound.

3,988,248

LITHIUM SOAP LUBRICATING GREASE

Hans Dieter Grassboff, Hamburg, Germany, assignor to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Continuation-in-part of Ser. No. 426,971, Dec. 20, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 559,120
Int. Cl.² C10M *3/18, 5/14, 7/20, 7/24*
U.S. Cl. 252—18 **5 Claims**

1. A lithium soap lubricating grease comprising
5 to 20 percent by weight of a lithium soap of a hydroxy fatty acid having 10 to 30 carbon atoms, 0.1 to 3 percent by weight of lithium tetraborate, and the remainder of lubricating oil, made by a process comprising:
admixing lithium soap and a mojor amount of the base oil;
dehydrating;
adding lithium tetraborate;
heating to a higher temperature of about 240° C.;
adding the remaining portion of the base oil;
cooling; and
homogenizing.

3,988,249

EXTREME PRESSURE ADDITIVE FOR LUBRICANTS

Richard A. Gencarelli, Cheshire; Keith A. Hughes, Naugatuck, and John F. Sierakowski, Watertown, all of Conn., assignors to Uniroyal Inc., New York, N.Y.

Filed Feb. 11, 1974, Ser. No. 441,723
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² C10M *1/38, 1/54*
U.S. Cl. 252—33.6 **4 Claims**

1. Antimony tris [N-(2-octyl)-N-ethyldithiocarbamate].
2. A composition comprising a synthetic lubricant in admixture with antimony N-(2-octyl)-N-ethyldithiocarbamate in amount sufficient to confer extreme pressure properties on the lubricant.

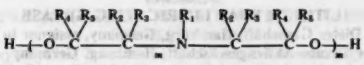
3,988,250

TONER COMPOSITION FOR USE IN ELECTROPHOTOGRAPHY COMPRISING NOVEL POLYESTER BINDER RESIN

Kahei Sakaguchi, and Hirotaka Takemoto, both of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Dec. 27, 1974, Ser. No. 536,904
Claims priority, application Japan, Dec. 29, 1973, 49-3685
Int. Cl.² G03G *9/08, 9/10, 9/12*
U.S. Cl. 252—62.1 R **10 Claims**

1. A toner composition capable of being charged with a positive electric charge and adapted for use in electrophotographic development, consisting essentially of finely divided particles containing from 1 to 20 parts by weight of a colorant and 80 to 99 parts by weight of binder resin, said binder resin consists essentially of
a. from 55 to 100 percent by weight of a polyester resin having a softening point of 80° to 130° C. and a nitrogen content of from 0.2 to 2.5 percent by weight, based on the total weight of said polyester resin, said polyester resin being obtained by reacting
1. a dicarboxylic acid component consisting essentially of from 50 to 100 mol percent of a substance selected from the group consisting of fumaric acid, maleic acid, succinic acid and anhydrides thereof, the balance of said dicarboxylic acid component being one or more polyester-forming dicarboxylic acids, or anhydrides thereof, with
2. a polyol component consisting essentially of from 10 to 100 mol percent of a glycol having the formula



wherein R is hydrogen unsubstituted, alkyl having one to 20 carbon atoms, unsubstituted phenyl, unsubstituted naphthyl or unsubstituted cyclohexyl wherein R_2, R_3, R_4 and R_5, which are the same or different, are hydrogen or methyl, and wherein m and n are integers and the sum of m plus n is from 2 to 20,

and the balance of said polyol component is one or more polyester-forming polyols, and

b. the balance of said binder resin is a binder resin having a softening point of 80° to 150° C selected from the group consisting of polystyrene, rosin maleate, petroleum resin and epoxy resin.

3,988,251

WIRE ENAMEL WITH LOW SOLDERING TEMPERATURE

Thomas A. Shelby, and Shelby W. Gallien, both of Fort Wayne, Ind., assignors to Rea Magnet Wire Co., Inc., Fort Wayne, Ind.

Filed Dec. 11, 1974, Ser. No. 531,458

Int. Cl.² C08K *5/01, 5/13;* **H01B** *3/20, 3/42*

U.S. Cl. 252—63.7 **8 Claims**

1. A wire enamel coating composition capable of forming an insulative coating on a wire characterized by a solderability of less than 1 second at a temperature of about 285-315° C and a thermoplastic flow temperature of at least 230° C and comprising:

a. 25–27 parts by weight of a polyurethane ester resin containing 4–10% by weight free hydroxyl content;

b. 23–25 parts by weight of a blocked isocyanate;

c. about 48–52 parts by weight of a solvent containing: 12–13 parts by weight of a semi-refined coal tar distillate characterized by distillation of 10 percent to not below 165° C, 70 percent to not above 190° C, and 95 percent to not above 235° C; about 24–26 parts of cresylic acid; and 12–13 parts by weight of xylene; and

d. 0.1 to 10.0% by weight of solids of a catalyst.

3,988,252

PROCESS FOR THE PRODUCTION OF Ba(Sr)FCl:Eu PHOSPHORS

August Ferretti, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 11, 1974, Ser. No. 522,880

Int. Cl.² C09K *11/46*

U.S. Cl. 252—301.4 H **7 Claims**

1. A method of making an X-ray phosphor with the formula

$$Ba_{1-x-y-z}\,Sr_x\,Eu_y\,R_zFCl$$

wherein

x is from 0 to 0.1; y is from 0.0001 to 0.2;

z is from 0 to 0.1 and R is Sm, Dy, Bi, Sb, or Zn which comprises

a. preparing an intimately mixed substantially stoichiometric mixture of appropriate metal chlorides and fluorides to form said composition including trivalent Eu, Sm, and Dy chlorides or fluorides, said mixture having at least 30% of particles below 1.5μ with the remainder of the particles having an average size less than 3μ as determined by an optical particle size analyzer,

b. firing said mixture in an atmosphere consisting of nitrogen, the noble gases, carbon dioxide, or carbon monoxide to maintain a temperature in the range 600° to 950° C for a time sufficient to effect reaction including the reduction of trivalent Eu to the divalent state whereby a compacted mass of phosphor particles is formed and

c. pulverizing said compacted mass.

3,988,253

COMPOSITION AND METHOD FOR TREATING SCALE

Jack F. Tate, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 20, 1974, Ser. No. 534,955

Int. Cl.² C02B *5/06*

U.S. Cl. 252—82 **1 Claim**

1. Method of controlling the build-up of inorganic mineral scale selected from the group consisting of calcium sulfate, barium sulfate and calcium carbonate in an aqueous system which comprises incorporating into said system a scale-treating composition consisting of an acqueous solution of from about 0.0005% to about 0.003% on a weight basis, of a water-soluble substituted taurine selected from the group consisting of sodium N,N-methyloleyltaurate, sodium N,N-methylpalmitoyltaurate and sodium N,N-methyl tall oil acids taurate.

3,988,254

DE-SMUTTING AGENT

Teruo Mori, Odawara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 14, 1974, Ser. No. 479,378

Claims priority, application Japan, June 14, 1973, 48-66362

Int. Cl.² C11D *7/56, 7/18*

U.S. Cl. 252—99 **2 Claims**

1. A method of removing smut from aluminum comprising treating the surface of said aluminum with a de-smutting agent consisting essentially of an aqueous solution containing at least 0.1% by weight of a water-soluble hydrogen peroxymonosulfate of the formula $MHSO_5$ wherein M is an alkali metal ion or an ammonium group and at least 0.1 mol/liter of a water-soluble hydrogen sulfate so that the de-smutting agent is acidic.

3,988,255

TOILET BARS

Paul Seiden, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 555,516, March 5, 1975, abandoned. This application Dec. 15, 1975, Ser. No. 640,660

Int. Cl.² C11D *9/26*

U.S. Cl. 252—107 **11 Claims**

1. A toilet bar suitable for providing a soft, smooth skin texture after use, said bar comprising:

a. from about 65% to 90% by weight of a soap selected from the group consisting of alkali metal, ammonium, and alkanolamine salts of fatty acids containing from about 8 to 24 carbon atoms;

b. from about 1% to 15% by weight of a mixture of non-ethoxylated sorbitan esters, said ester mixture comprising:

i. from about 5% to 50% by weight of mixture of mono-ester materials,

ii. from about 20% to 90% by weight of mixture of di-ester materials, and

iii. from about 0% to 75% by weight of mixture of tri- and tetra-ester materials; the ester moieties in said sorbitan ester materials being derived from fatty alkyl groups containing from about 12 to 22 carbon atoms; and

c. from about 4% to 25% by weight of moisture.

10. A method of imparting a soft, smooth feeling to skin during and after skin cleansing, said method comprising:

A. applying to the skin an effective amount of a soap composition from a toilet bar, said bar comprising:

i. from about 65% to 90% by weight of a soap selected from the group consisting of alkali metal, ammonium and alkanolamine salts of fatty acids containing from about 8 to 24 carbon atoms;

ii. from about 1% to 15% by weight of a skin conditioning agent selected from the group consisting of ethoxylated sorbitan ester mixtures containing from one to 10 oxyethylene moieties at one or more of the unesterified —OH

groups and non-ethoxylated sorbitan ester mixtures and combinations thereof, said mixtures comprising

a. from about 5% to 50% by weight of mixture of mono-ester materials,

b. from about 20% to 90% by weight of mixture of di-ester materials, and

c. from about 0% to 60% by weight of mixture of tri- and tetra-ester materials; the ester moieties of the sorbitan esters in said mixtures being derived from fatty alkyl groups containing from about 12 to 22 carbon atoms; and

iii. from about 4% to 25% by weight of moisture; and

B. subsequently rinsing the skin with water.

3,988,256
PHOTORESIST STRIPPER RINSE

John E. Vandermey, Stirling; Harold F. Jones, Dover, both of N.J., and Harold T. Dill, Andover, Mass., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 3, 1974, Ser. No. 457,337
Int. Cl.² C23G 5/02
U.S. Cl. 252—171 **4 Claims**

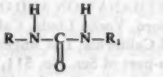
1. A process for removing a photoresist stripper from a substrate consisting essentially of rinsing the substrate with a composition which consists essentially of from about 65 to about 98.5 weight percent methylene chloride and from about 1.5 to about 35 weight percent of an alcohol selected from the group consisting of isopropanol, tertiary butanol and mixtures thereof.

3,988,257
EPOXY RESIN ACCELERATOR

Tony Harrison, Maidenhead, and Roger G. Weatherhead, Epsom, both of England, assignors to Shell Oil Company, Houston, Tex.

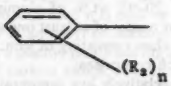
Division of Ser. No. 534,952, Dec. 20, 1974, Pat. No. 3,945,971. This application Sept. 29, 1975, Ser. No. 617,349
Claims priority, application United Kingdom, Jan. 3, 1974, 279/74
Int. Cl.² C08G 59/56
U.S. Cl. 252—182 **4 Claims**

1. A curing composition for curing epoxy resins having an epoxy equivalency greater than 1.0 which comprises a mixture of (1) an accelerator of the general formula:



wherein

R is



R_2 is selected from the group consisting of an alkyl group containing from 1 to 4 carbon atoms, chlorine and bromine,

n is 0, 1 or 2, and

R_1 is selected from the group consisting of R and H, and (2) a polyamine curing agent having more than one non-tertiary amino group per molecule.

3,988,258
RADWASTE DISPOSAL BY INCORPORATION IN MATRIX

Derry H. Curtiss, and Harold W. Heacock, both of Kennewick, Wash., assignors to United Nuclear Industries, Inc., Richland, Wash.

Filed Jan. 17, 1975, Ser. No. 541,935
Int. Cl.² G21F 9/20
U.S. Cl. 252—301.1 W **9 Claims**

1. In a method of processing radioactive wastes wherein a slurry of radioactive wastes and a cementing material is formed in a mixer and the slurry then transferred from the mixer to a storage and shipping container and allowed to harden therein, the improvement of increasing shipping efficiency by including in the slurry before hardening an alkali or alkaline earth metal silicate, and for each 100 parts by weight of the waste included in the slurry adding 25–70 parts by weight of the cementing material and 5–25 parts by weight of the silicate.

3,988,259
CATALYST REGENERATION

Gardner C. Ray, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 20, 1975, Ser. No. 569,410
Int. Cl.² B01J 21/20, 23/92; C02B 1/34
U.S. Cl. 252—416 **13 Claims**

1. A process for regenerating a catalyst which has becme inactive by contacting it with oxygen and polluted water containing oxidizable organic contaminants therein whereby contaminants are oxidized to carbon dioxide, and which catalyst consists essentially of a support which does not lose its integrity when contacted with vapor, water and oxygen under elevated temperature conditions selected from the group consisting of Group II metal aluminates and Group IVB metal oxides, promoted with 0.05–20 weight percent of (1) at least two different metals active for initiation of oxidative reactions selected from the group of metals of Groups IIIB, IVB, VB, VIB, VIIB, VIII, IB and Va of the Periodic Table and (2) a rare earth metal, said process comprising contacting said catalyst with hydrogen at an elevated temperature of about 350° F to about 1200° F.

2. A process in accordance with claim 1 comprising

a. periodically regenerating said catalyst by calcination in a free oxygen-containing gas selected from the group consisting of oxygen, oxygen-enriched air and air,

b. determining the activity of the catalyst after stable conditions after regeneration have been reached,

c. removing free oxygen from said catalyst after said activity has decreased under a first predetermined value, and

d. thereafter contacting said catalyst with hydrogen under elevated temperature conditions.

10. A process in accordance with claim 1 wherein a catalyst is used containing about 4 weight percent copper, about 2 weight percent manganese and about 1 weight percent lanthanum on zinc aluminate calculated as the metal on the zinc aluminate.

11. A process in accordance with claim 1 wherein the activity of the catalyst is determined after each hydrogen regeneration and wherein said catalyst is reimpregnated with promoter metal salts and is calcined in air when said activity has fallen below a second predetermined value.

3,988,260
OXIDATIVE REVIVIFICATION OF MOLECULAR SIEVE CATALYSTS ADMIXED WITH REFRACTORY PARTICLES

Willis W. Weber, South Salem, and Donald F. Best, Mahopac, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed May 9, 1975, Ser. No. 576,142
Int. Cl.² B01J 29/38
U.S. Cl. 252—418 **4 Claims**

1. Process for regenerating a mass of coked zeolite molecular sieve-containing particles which comprises providing a homogeneous mixture of particles of zeolitic molecular sieve composition containing greater than 2 weight per cent based on the weight of the molecular sieve particle of a hydrocarbonaceous coke formed thereon, with from 2 to 10 times the weight thereof of particles of an inert refractory material essentially free of coke formation the particles of said mixture having a minimum particle size of 200 mesh and having a maximum dimension along any axis of 13 millimeters, and heating said mixture to a temperature of from 500° C. to 725° C. in air and the reaction products of air and the hydrocarbonaceous coke on said molecular sieve particles in a rotary kiln for a period of time to reduce the coke deposit to less than 2 weight per cent.

2. Process according to claim **1** wherein the coked zeolitic molecular sieve-containing particles being treated contain initially at least 8 weight per cent coke, and the particles of refractory material are size separable from the molecular sieve-containing particles.

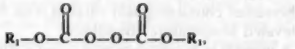
3. Process according to claim **2** wherein the refractory material is quartz.

3,988,261
FROZEN ORGANIC PEROXIDE EMULSION

James A. Barter; Henry C. Stevens, both of Akron, Ohio, and John F. Van Hoozer, Bethel Park, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

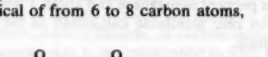
Filed July 28, 1975, Ser. No. 599,797
Int. Cl.² C08F 4/34
U.S. Cl. 252—431 C **20 Claims**

1. A frozen organic peroxide aqueous emulsion comprising (a) from 30 to 75 weight percent of organic peroxide selected from the group.



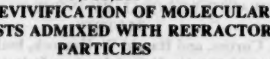
1.

wherein R_1 is an aliphatic radical of from 1 to 20 carbon atoms or an aromatic radical of from 6 to 8 carbon atoms,



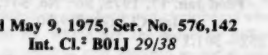
2.

wherein R_2 is an aliphatic radical of from 1 to 20 carbon atoms or an aromatic radical of from 6 to 8 carbon atoms,



3.

wherein R_3 is an aliphatic radical of from 4 to 12 carbon atoms or a cycloaliphatic radical of from 3 to 10 carbon atoms, and



4.

wherein R′ is an aliphatic radical of from 2 to 12 carbon atoms and R″ is an aliphatic radical of from 1 to 8 carbon atoms, (b) an emulsifying amount of water soluble surfactant, and (c) the remainder water.

3,988,262
METHANATION CATALYST AND PROCESS FOR PREPARING THE CATALYST

Kjeld Jorn Andersen, Hillerod; Roberto Candia, Birkerod, and Jens Rostrup-Nielsen, Virum, all of Denmark, assignors to Haldor Topsøe A/S, Soborg, Denmark

Filed July 2, 1975, Ser. No. 592,438
Claims priority, application United Kingdom, July 3, 1974, 29418/74
Int. Cl.² B01J 21/06, 23/76
U.S. Cl. 252—466 J **7 Claims**

1. A catalyst for methanation reactions consisting essentially of nickel and a porous material containing alumina and zirconia, the components being evenly distributed amongst each other, wherein the content of nickel is from 15 to 40% by weight, calculated as nickel oxide, of the total catalyst and zirconia and alumina are present in a ratio of from 0.05 to 2.0 parts by weight of zirconia per part by weight of alumina and which catalyst has been prepared by the sequential steps of (a) preparing an aqueous solution of a nickel salt and containing, in at least partly dissolved state, aluminum and zirconium compounds thermally decomposable to the oxides, (b) precipitating substantially all metal ions from said aqueous solution by the addition of a base, (c) isolating and drying the precipitated metal compounds mixed with any undissolved compounds present in the system formed in step (b), (d) converting the thus-formed mixture of compounds into a mixture of the corresponding oxides by calcination at temperatures between 300° and 500° C., (e) working up the thus-formed oxides mixture into particles of any desired shape and size, (f) subjecting and shaped particles to a firing temperature of between 800° and 1100° C. for two to ten hours and (g) subsequently at least partially reducing the nickel oxide present in the fired particles into metallic nickel.

3,988,263
THERMALLY STABLE COPRECIPITATED CATALYSTS USEFUL FOR METHANATION AND OTHER REACTIONS

Rowland C. Hansford, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 511,189, Oct. 2, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 621,769
Int. Cl.² B01J 21/04, 23/06, 23/72, 23/74
U.S. Cl. 252—466 J **10 Claims**

1. A method for the manufacture of a composite catalyst comprising about 20–95 wt.% of alumina and about 5–80 wt.% of an oxide or oxides of at least one active divalent metal selected from the class consisting of iron, cobalt, nickel, copper and zinc, which comprises:

1. forming at a relatively low temperature a homogeneous aqueous solution of an aluminum salt, a salt or salts of at least one of said active metals, and a delayed precipitant, said delayed precipitant being a water-soluble compound which, at said relatively low temperature, does not bring about any significant precipitation of the metal salts dissolved in said solution, but which will hydrolyze at a relatively higher temperature to form ammonia and carbon dioxide;

2. heating said aqueous solution to a sufficiently high temperature and for a sufficient time to bring about hydrolysis of said delayed precipitant with resultant gradual increase in pH of said solution, and formation of a homogeneous coprecipitate of basic compounds of aluminum and of the divalent metal content of said solution;
3. separating said coprecipitate from said solution before the latter reaches a pH above about 8; and
4. drying and calcining said coprecipitate.

3,988,264

WINDSHIELD CLEANER FORMULATION

William F. Werzner, Wood River, and Paul J. Aderholt, Belleville, both of Ill., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 20, 1973, Ser. No. 426,886
Int. Cl.² C11D 3/065
U.S. Cl. 252—527 **4 Claims**

1. A glass-cleaning composition consisting essentially of the following ingredients in the indicated weight proportions, based on 100 parts by weight:

a.	lithium salt of an aminopolycarboxylic acid chelating agent	0.001 to 5.0
b.	lithium salt of an anionic linear alkylated aryl sulfonic acid	0.01 to 10.0
c.	boric acid	0.02 to 3
d.	inhibitor of copper/brass corrosion	0.005 to 0.5
e.	methanol	5 to 60
f.	water	remainder

3,988,265

DETERGENT COMPOSITIONS CONTAINING 1-HYDROXYALKANE-SULFATE, SURFACTANTS, INORGANIC BUILDER, HAVING GOOD RINSING CHARACTERISTICS

Haruhiko Arai, Narashino; Kaoru Tsujii, Funabashi, and Hisashi Kasai, Wakayama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Aug. 7, 1974, Ser. No. 495,433
Claims priority, application Japan, Aug. 10, 1973, 48-90154
Int. Cl.² C11D 3/065, 1/12
U.S. Cl. 252—532 **4 Claims**

1. A detergent composition effective for washing clothing, hair, kitchen articles and the like, consisting essentially of:

A. from 3 to 50 percent by weight of water-soluble 1-hydroxyalkane-sulfate having from 12 to 22 carbon atoms;

B. a water-soluble anionic organic surface active agent selected from the group consisting of linear and branched alkylbenzene sulfonates having an alkyl chain of 10 to 18 carbon atoms, alkyl sulfates having 10 to 18 carbon atoms, α-olefin sulfonates having 14 to 22 carbon atoms, alkane sulfonates having 12 to 22 carbon atoms, polyoxyethylene(1–12 mols)alkyl(C_{12}–C_{18}) ether sulfates, carboxy alkyl ether compounds of the formula R-(OA)$_n$O$(CH_2)_m$COOM in which n is zero or a positive integer of up to 100, R is an alkyl or alkenyl group of 8 to 24 carbon atoms or a phenyl group having an alkyl or alkenyl group of 8 to 18 carbon atoms, A is an alkylene group of 2 to 4 carbon atoms, m is 1 or 2 and M is a water solubility-imparting cation and salts of fatty acids having 12 to 20 carbon atoms, or a water-soluble nonionic organic surface active agent being an ethylene oxide addition product of a compound selected from the group consisting of alcohols having 12 to 18 carbon atoms, alkyl phenols having an alkyl group of 8 to 14 carbon atoms, sorbitan esters of fatty acids of 12 to 18 carbon atoms and fatty acids having 12 to 20 carbon atoms, or a mixture of said anionic and nonionic surface active agents; and

C. water-soluble neutral inorganic builder salts, or water-soluble alkaline inorganic builder salts, or water-soluble organic builders, or mixtures thereof.

4. A detergent composition as claimed in claim 1 in which component C is sodium pyrophosphate, or sodium tripolyphosphate, or sodium sulfate, or sodium carbonate, or water-soluble sodium silicates, or sodium borate, or sodium nitrilotriacetate, or sodium citrate, or sodium carboxylate, or sodium carboxymethyl cellulose, or polyethylene glycol, or polypropylene glycol, or ethanol, or mixtures thereof.

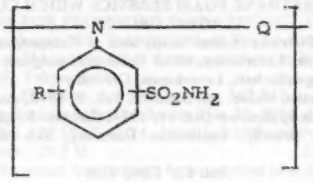
3,988,266

INTUMESCENT COMPOSITION

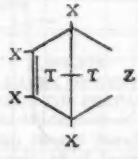
Shirley H. Roth, Highland Park, N.J., assignor to Cities Service Company, Tulsa, Okla.

Filed Mar. 8, 1976, Ser. No. 664,739
Int. Cl.² C08G 12/08; C08J 9/02
U.S. Cl. 260—2.5 FP **13 Claims**

1. An intumescent composition comprising (A) a water-insoluble amine-aldehyde copolymer intumescent agent having a number average molecular weight of about 350–2000 and consisting essentially of repeating units corresponding to the formula:



wherein Q is the aldehyde residue and R is hydrogen, alkyl, haloalkyl, alkoxy, haloalkoxy, halo, nitro, acetamido, or sulfonamido and (B) about 10–50%, based on the weight of the intumescent agent, of a synergist corresponding to the formula:



wherein X is chloro or bromo, T is halo, hydrogen, or a hydrocarbyl or hydrocarbyloxy group, and Z is a monocyclic divalent saturated polybromocycloalkylene group containing 5–16 carbon atoms and 2–6 bromine atoms; said valences being on adjacent carbon atoms.

3,988,267

QUATERNARY HYDROXYALKYL TERTIARY AMINE BASES AS POLYURETHANE CATALYSTS

Ibrahim S. Bechara, Boothwyn; Felix P. Carroll, Chester; Rocco L. Mascioli, Media, all of Pa., and John R. Panchak, Wilmington, Del., assignors to Air Products and Chemicals, Inc., Wayne, Pa.

Continuation-in-part of Ser. No. 377,447, July 9, 1973, Pat. No. 3,872,687. This application Aug. 14, 1974, Ser. No. 497,194

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.[2] C08G *18/14, 18/18*

U.S. Cl. 260—2.5 AC **11 Claims**

1. In the method of preparing cellular polyurethane plastic by the reaction of a precursor comprising a polyol having at least two alkanol groups per molecule, an organic polyisocyanate compound containing at least two isocyanate groups per molecule, a volatilizable blowing agent, and a catalyst, the improvement which comprises carrying out said reaction in the presence of a quaternary hydroxyalkyl tertiary amine base catalyst prepared by reacting substantially stoichiometric amounts of water or a carbinol selected from the group consisting of methanol, ethanol, benzyl alcohol, furfuryl alcohol, allyl alcohol, phenol, octylphenol, nonylphenol, methylphenol, methoxyphenol, ethoxyphenol, 3-diethylamino phenol, naphthol, resorcinol, 1,4-hydroquinone, chlorophenols, chloronathphols and p,p′-dihydroxydiphenyldimethylmethane; an alkylene oxide selected from the group consisting of propylene oxide, ethylene oxide, 1,2-butylene oxide, 1,2-pentene oxide, styrene oxide, butadiene epoxide, diepoxides prepared from p,p′-dihydroxydiphenyldimethylmethane and epichlorohydrin, an olefin oxide having 9–14 carbon atoms and mixtures thereof; and a tertiary amine selected from the group consisting of trimethylamine, triethylamine, tripropylamine, triisobutylamine and mixtures thereof.

2. The method of claim 1 wherein said catalyst also contains a tertiary amine.

3,988,268

POLYURETHANE FOAM PLASTICS WHICH CONTAIN IONIC GROUPS

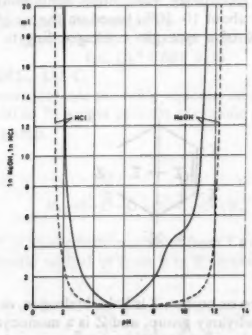
Werner Dietrich; Helmut Reiff, both of Cologne, and Dieter Dieterich, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 330,893, Feb. 9, 1973, abandoned. This application Oct. 11, 1974, Ser. No. 514,034

Claims priority, application Germany, Feb. 17, 1972, 2207350

Int. Cl.[2] C08J *9/06*

U.S. Cl. 260—2.5 AN **1 Claim**



1. In a process for the production of polyurethane foam plastics by process which comprises reacting (a) an organic polyisocyanate with (b) organic compound containing active hydrogen containing atoms reactive with -NCO groups and fixed ionic groups in the presence of a blowing agent, the improvement which comprises employing 5-100% by weight of the total weight of (b) of a mixture of both:

1. compounds which contain fixed cationic groups and the corresponding mobile anionic groups associated with said fixed groups selected from the group consisting of salts of polyester polyols containing carboxyl or sulphonic acid groups with a molecular weight below about 1500, reaction products of higher functional alcohols which have a molecular weight of up to about 250 with aliphatic or aromatic dicarboxylic acid anhydrides, and polyether esters which contain hydroxyl groups and have a molecular weight of less than 1500 obtained by reacting an alkoxylated higher valent alcohols with aliphatic or aromatic dicarboxylic anhydrides, and
2. compounds which contain fixed anionic groups and the corresponding mobile cationic groups associated with said fixed groups which are salts of hydroxyl polyethers which contain tertiary amino groups and have a molecular weight below about 1500 obtained by reacting alkylene oxides with primary or secondary amines or amino alcohol.

3,988,269

HIGH LOAD-BEARING, HIGH STRENGTH POLYURETHANE FOAM

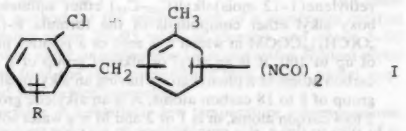
John E. Puig, Wallingford, and John S. Babiec, Jr., Orange, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Apr. 7, 1975, Ser. No. 565,491

Int. Cl.[2] C08G *18/14, 18/76*

U.S. Cl. 260—2.5 AT **17 Claims**

1. In a process for preparing high load-bearing, high strength flexible polyurethane foam from a reaction mixture comprised of an organic polymeric isocyanate, a polyether polyol reactant characterized by (1) a molecular weight of at least about 4,000, (2) an aliphatic nucleus having from about 2 to about 8 hydroxyl groups, (3) polyoxyalkylene chain segments attached to said nucleus, and (4) a ratio of primary to secondary hydroxyl end groups ranging from about 1.5:1 to about 5.5:1, a foaming agent, a reaction catalyst, and a surfactant, the improvement which comprises including in said reaction mixture a chlorine-containing methylene-bridged isocyanate of the formula:



I

wherein R is H or Cl, and wherein the weight ratio of said chlorine-containing methylene-bridged diaryl diisocyanate to said organic polymeric isocyanate is from about 50:50 to about 95:5.

3,988,270

EXTRUDABLE THERMOPLASTIC COMPOSITIONS CONTAINING A FLOUR FILLER

Melmuth S. Willis, Jr.; Melmuth S. Willis, Sr., both of Aiken, and Jack D. Young, Gray Court, all of S.C., assignors to Johnston Flour Mills, Inc., Johnston, S.C.

Continuation-in-part of Ser. No. 520,623, Nov. 4, 1974, abandoned. This application June 9, 1975, Ser. No. 584,718

Int. Cl.² C08L *1/00*

U.S. Cl. 260—17.4 R 10 Claims

1. A thermoplastic composition suitable for extrusion from an unvented extrusion apparatus consisting essentially of a thermoplastic resin selected from the group consisting of polyamides and polymers from ethylenically unsaturated monomers from about 1% to about 30% by weight of a finely-divided filler selected from the group consisting of rice hull flour, cherry pit flour, pecan shell flour and walnut shell flour; and said filler containing up to about 3.0% by weight of water based on the weight of the filler.

3,988,271

FLAME RETARDANT NYLON COMPOSITION CONTAINING AN ALUMINUM SALT AND AN ALIPHATIC ALCOHOL

Richard E. Phillips, Jr., Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

Filed Mar. 3, 1975, Ser. No. 554,867

Int. Cl.² C08J *3/20*

U.S. Cl. 260—18 N 8 Claims

1. A composition of matter having improved flame retardant and mold release characteristics, comprising a nylon polyamide and from 500 to 5000 ppm each of a C_{12} to C_{20} aliphatic alcohol and an aluminum salt of a C_{12} to C_{20} fatty acid such that the ratio of the parts of salt to the parts of alcohol is at least 1.0.

3,988,272

PRODUCTION OF THERMOSET WATER-IN-OIL EMULSIONS

Golden F. Watts, Rosemount, and Carlton E. Coats, Burnsville, both of Minn., assignors to Ashland Oil, Inc., Ashland, Ky.

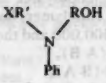
Continuation of Ser. No. 135,684, April 20, 1971, abandoned, which is a continuation-in-part of Ser. No. 110,855, Jan. 29, 1971, abandoned. This application Jan. 24, 1973, Ser. No. 326,211

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C08L *67/06*

U.S. Cl. 260—22 CB 24 Claims

1. A method of curing polymerizable water-in-oil emulsions in which at least a major weight portion of the oil phase is one or more α, β-ethylenically unsaturated polyester resin of a member selected from the group consisting of α,β-ethylenically unsaturated polycarboxylic acid, anhydrides thereof, and mixtures thereof; and a member selected from the group consisting of polyhydric alcohol, alkylene oxide, and mixtures thereof; and is susceptible to free radical induced polymerization and copolymerizable ethylenically unsaturated compounds susceptible to free radical induced polymerization wherein said emulsion contains and is polymerized to thermoset form with the aid of at least one peroxy free radical generating catalyst compound, oil soluble cobalt salt of carboxylic acid promotor and at least about four coordination equivalents per mole of cobalt as metal of as least one amine compound promotor having at least one hydroxy alkyl group connected to the amino nitrogen and having the following formula:



wherein X is a hydroxy group, R and R' are identical or different divalent saturated aliphatic hydrocarbon groups having 1–6 carbon atoms and Ph is phenyl; and the weight of said combination of amine, cobalt salt and peroxy catalyst is equal to about 0.25 to about 10% by weight, based on the polymerizable ingredients of the emulsion.

6. The method of claim 1 wherein said cobalt salt is selected from the group of consisting of cobalt neodecanate, cobalt tallate, cobalt stearate, cobalt octoate, cobalt linoleate, and cobalt naphthenate.

3,988,273

AQUEOUS COATING COMPOSITION

Aihara Tetsuo; Watanabe Tadashi; Nakayama Yasuharau; Yamashita Yoshio, and Toyomoto Isao, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Amagasaki, Japan

Filed Mar. 19, 1975, Ser. No. 559,769

Claims priority, application Japan, Mar. 28, 1974, 49-34960

Int. Cl.² C08L *91/00*

U.S. Cl. 260—23 AR 10 Claims

1. An aqueous coating composition comprising an aqueous medium and a binder resin dispersed therein as neutralized with a base, the binder resin being a copolymer of (A) a monomer prepared by reacting at least one glycidyl ester of acrylic acid and methacrylic acid with at least one fatty acid of drying oil fatty acid and semi-drying oil fatty acid, (B) an α,β-ethylenically unsaturated acid and (C) an unsaturated monomer containing substantially no carboxyl group and having a Q value of at least 0.1 as determined by Q-e theory.

3,988,274

PROCESS FOR PRODUCING SOFT CONTACT LENSES

Eiichi Masuhara; Niro Tarumi, both of Tokyo, and Makoto Tsuchiya, Musashino, all of Japan, assignors to Hoya Lens Co., Ltd., Tokyo, Japan

Filed Feb. 6, 1975, Ser. No. 547,543

Claims priority, application Japan, May 27, 1974, 49-59479

Int. Cl.² C08F *18/24*, *216/02*; B29D *11/00*

U.S. Cl. 260—29.7 H 11 Claims

1. A soft contact lens having a water content of at least 45% and a tensile strength of at least 100 g/mm² and consisting essentially of a copolymer of 70 to 93% by weight of an alkylene glycol monoacrylate or monomethacrylate, 0.3 to 2.0% by weight of a polyfunctional monomer consisting of a diester of a polyethylene glycol, 1 to 10% by weight of an unsaturated aliphatic monomeric acid having at least one carboxyl group in its molecule and 5 to 20% by weight of an alkyl acrylate or methacrylate, said lens having been swelled by hydration in an aqueous alkaline solution.

3,988,275

CONCENTRATED LATEX OF SYNTHETIC RUBBERS AND THE METHOD FOR THE PREPARATION THEREOF

Kunio Satake; Takeshi Wada, both of Yokohama; Kuniaki Sakamoto, Kawasaki; Hiroshi Harada, Yokohama, and Yasushi Sato, Kawasaki, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sept. 5, 1974, Ser. No. 503,433

Claims priority, application Japan, Sept. 5, 1973, 48-99153; Sept. 5, 1973, 48-99154; July 26, 1974, 49-85090

Int. Cl.² C08L *91/00*

U.S. Cl. 260—23 R 11 Claims

1. A concentrated aqueous latex comprising:

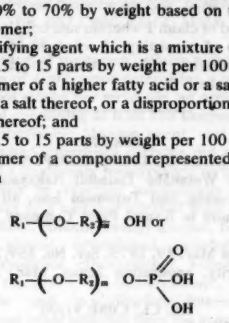
1. at least one block copolymer selected from the group consisting of block copolymers having a molecular weight of from 10,000 to 500,000 and the general configuration: A-B-A; $(A-B)_n$; B-$(A-B)_n$, A-$(A-B)_n$ and A-B-$(B-A)_n$

wherein n is an integer of at least 2, A is a non-elastic polymer or copolymer containing styrene or α-methyl styrene and having a second order transition temperature of at least 25° C, and B is an elastic polymer or copolymer containing 1,3-butadiene or isoprene having a second order transition temperature up to 10° C, the A- content of said block copolymer being from 10% to 70% by weight based on the total weight of said copolymer;

2. an emulsifying agent which is a mixture of:

a. from 0.5 to 15 parts by weight per 100 parts by weight of polymer of a higher fatty acid or a salt thereof, rosin acid or a salt thereof, or a disproportioned rosin acid or a salt thereof; and

b. from 0.5 to 15 parts by weight per 100 parts by weight of polymer of a compound represented by the general formula



wherein R_1 is alkyl having 8–18 carbons or alkylphenyl in which the alkyl has 8–12 carbons, R_2 is alkylene having 2–5 carbons and m is an integer from 3 to 50.

3,988,276

SOLID POLYSULFIDE CONTAINING HOT MELT SEALANTS, ADHESIVES AND THE LIKE

Edward F. Kutch, Trenton, N.J.; Robert M. Meyers, Fairless Hills, Pa., and Matthew M. Sitter, Covent Station, N.J., assignors to Novagard Corporation, Trenton, N.J.

Continuation-in-part of Ser. No. 460,332, April 12, 1974, Pat. No. 3,932,341, which is a continuation of Ser. No. 256,928, May 25, 1972, abandoned. This application Oct. 29, 1975, Ser. No. 626,694

Int. Cl.² C08L *93/00*

U.S. Cl. 260—24 **7 Claims**

1. Solvent free hot-melt compositions adapted to be extruded for use as sealants, adhesives, caulking compounds, expansion joints and the like consisting essentially of an unreacted mechanical mixture of 100 parts by weight of a polymerized elastomeric polysulfide compound having a molecular weight above about 15,000; with from about 1 to 400 parts by weight of tackifying resin selected from the group consisting of terpene resins, polyterpene resins, phenolic resins, hydrogenated rosin, hydrocarbon resins, and mixtures thereof; from about 15 to 600 parts by weight of plasticizer selected from the group consisti .g of polybutenes, polyisobutylenes, phosphate esters, dibutyl phthalate, straight chain aliphatic acid esters, parafine oils, coal tars, asphalts, chlorinated polyphenyl, chlorinated biphenyl and mixtures thereof; from about 0.5 to 60 parts by weight of adhesion promoter selected from the group consisting of epoxy resins organic silanes, urethane polyesters and polyethers, ethylene vinyl acetate, phenolic resins and non-reacting mixtures thereof; and from about 5 to 1000 parts of inert filler material; said composition being readily extrudable at temperatures above about 150° while hardening upon cooling without undergoing chemical change, and having a hardness of about 5 to 95 on a Shore A Durometer at room temperature.

3,988,277

STABILIZED MANNICH BASE SOLUTIONS

Charles Richard Witschonke, Noroton, and Robert Rabinowitz, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 21, 1974, Ser. No. 526,023

Int. Cl.² C08K *5/31*

U.S. Cl. 260—29.6 AT **10 Claims**

1. An aqueous solution of a Mannich base of a polyvinylamide stabilized against viscosity increase and gelation containing a stabilizing amount of a formaldehyde scavenger.

3,988,278

STABLE POLYMER LATEX AND PROCESS FOR MAKING SAME

Dennis C. Bartizal, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 17, 1970, Ser. No. 64,564

Int. Cl.² C08G *18/00*; C08L *75/00*

U.S. Cl. 260—29.2 TN **10 Claims**

1. A latex comprising:

I. a predominantly aqueous continuous phase, and

II. 5 to 70% by weight of said latex of particles up to 25 microns in diameter of poly(urethane)urea polymer dispersed in said aqueous phase, said polymer when formed into a film and elongated at 50.8 cm/min at room temperature exerting a tensile stress of greater than 70 p.s.i. at an elongation of 100%, or at break when less than 100% longation, said latex resulting from substantially simultaneous emulsification and chain extension in said aqueous phase of an isocyanate-terminated prepolymer in which at least 25 percent of the molecules contain hydrophilic capping moieties on chains pendant from the prepolymer backbone, said pendant chains containing 15 – 100 atoms in the chain, and said prepolymer containing at least one said capping moiety for each 9000 theoretical prepolymer atomic mass units.

3,988,279

THERMOSETTING CONCRETE-CONTAINING EPOXY

Harold C. Klassen, New Albany, Ind., assignor to Celanese Coatings & Specialties Company, Louisville, Ky.

Filed Apr. 23, 1975, Ser. No. 570,906

Int. Cl.² C08G *51/24*

U.S. Cl. 260—29.2 EP **11 Claims**

1. A cement composition comprising:

a. 100 parts by weight of hydraulic cement;

b. about 5 to about 75 parts by weight of a curable epoxide resin powder which is a blend of an epoxide resin having more than one 1,2-epoxide group per molecule and a modified Durrans melting point in excess of about 75° C. and a neutral or basic type latent curing agent which melts and is activated above 60° C. wherein said curing agent is present in the amount of about 1 to about 25 percent by weight, based on the weight of the epoxide resin;

c. about 20 to about 300 parts by weight of water; and

d. about 10 to about 500 parts by weight of aggregate.

3,988,280

WATER-DISPERSIBLE THERMOSETTABLE CATIONIC RESINS AND PAPER SIZED THEREWITH

Paul H. Aldrich, Greenville, and David H. Dumas, Hockessin, both of Del., assignors to Hercules Incorporated, Wilmington, Del.

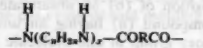
Division of Ser. No. 393,690, Aug. 31, 1973, Pat. No. 3,922,243. This application Apr. 28, 1975, Ser. No. 572,598

Int. Cl.² C08L *77/06*; C08G *69/48*

U.S. Cl. 260—29.2 EP **6 Claims**

1. A composition consisting essentially of an aqueous dispersion of a water-insoluble, water-dispersible thermosettable cationic resin derived by reacting (I) an epihalohydrin and (II)

a water-insoluble modified aminopolyamide derived by reacting (a) a water-soluble long chain aminopolyamide derived by reaction of a polyalkylenepolyamine and a dicarboxylic acid, said aminopolyamide having recurring groups



wherein n is an integer 2 through 6, x is an integer 2 through 4, and R is a divalent hydrocarbon radical, and (b) an acyl halide having the formula R'COX where X is a halide and R' is a hydrocarbon radical containing a total of from about 11 to about 39 carbon atoms, the amount of acyl halide employed being that sufficient to provide a modified aminopolyamide that is water-insoluble but insufficient to react with more than about 50% of the secondary amine groups of the aminopolyamide, the amount of epihalohydrin employed being at least that amount sufficient to react with substantially all the secondary amine groups of the modified aminopolyamide.

3,988,281
WATER-DISPERSIBLE THERMOSETTING COATING COMPOSITION

Giichi Minami, Kobe; Yukihiro Manabe, Amagasaki, and Yasuo Suematsu, Itami, all of Japan, assignors to Shinto Paint Co., Ltd., Amagasaki, Japan

Continuation-in-part of Ser. No. 358,929, May 10, 1973, abandoned. This application Jan. 23, 1975, Ser. No. 543,477
Claims priority, application Japan, May 19, 1972, 47-49593
Int. Cl.² C08G *59/50;* **C08L** *63/00*
U.S. Cl. 260—29.6 TA **5 Claims**

1. An aqueous thermosetting coating composition suitable for electrodeposition onto the surface of an article used as a cathode and comprising an aqueous solution or dispersion of a resinous material and an organic and/or inorganic acid, said resinous material being prepared by reacting (i) a secondary amine with (ii) epoxy groups pendant from a main chain of a copolymer of 5–50% by weight of an ethylenically unsaturated monomer containing epoxy groups and 50–95% by weight of one or more of vinyl or acrylic unsaturated monomers which do not contain epoxy groups and which are copolymerizable with the ethylenically unsaturated monomer, wherein said vinyl or acrylic unsaturated monomers are selected from the group consisting of styrene, substituted styrenes, vinyl esters of alkanoic acids containing 2–18 carbon atoms, acrylonitrile, methacrylonitrile, 1–18 carbon atoms-containing alkyl esters of acrylic or methacrylic acid, 2–4 carbon atoms-containing hydroxy alkyl esters of acrylic or methacrylic acid, and dialkyl esters of α,β-unsaturated dibasic acids, the amount of the secondary amine being 0.1–0.8 equivalent per 1 equivalent of epoxy groups contained in said copolymer.

3,988,282
QUICK-CURING WATER RESISTANT SILICA-ALKALI METAL COATINGS AND PROCESSES THEREFOR

Ronald Wentworth Beers, Spring, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 426,438, Dec. 20, 1973, Pat. No. 3,893,864. This application May 5, 1975, Ser. No. 574,814
Int. Cl.² C08L *9/08*
U.S. Cl. 260—29.7 H **5 Claims**

1. A liquid composition especially well adapted to function as a vehicle from which especially fast-curing water-resistant coatings can be obtained comprising in combination:

I. 10 to 45 percent by weight of solids comprising
- A. From about 10 to 60 weight percent solids of fugative NH_4+ ion stabilized colloidal silica based on total silica solids in said composition;
- B. The 90 to 40 weight percent balance of silica solids comprising silica or silicate containing materials selected from the group consisting essentially of
  1. Organic quaternary ammonium silicates;
  2. Alkali stabilized colloidal silicas;
  3. Alkali metal silicates selected from the group consisting of
     a. potassium silicates
     b. lithium silicates
     c. sodium-lithium silicates and
  4. Mixtures of the foregoing;

II. 90 to 55 weight percent of water; and

III. About 4 to 30% by weight of the total composition of a reactive latex.

3,988,283
WIRE ENAMEL WITH LOW SOLDERING TEMPERATURE

Thomas A. Shelby, and Shelby W. Gallien, both of Fort Wayne, Ind., assignors to Rea Magnet Wire Co., Inc., Fort Wayne, Ind.

Filed Apr. 3, 1975, Ser. No. 564,851
Int. Cl.² C08K *5/01, 5/13;* **C08L** *79/08*
U.S. Cl. 260—33.4 P **7 Claims**

1. A wire enamel coating composition capable of forming an insulative coating on a wire characterized by a solderability of less than 1 second at a temperature of about 285°–315° C and a thermoplastic flow temperature of at least 230° C and comprising:

I. 1 part by weight of coating composition of a resin mixture containing:
- a. 1 part by weight of an imidized polyester resin containing 4–10% by weight free hydroxyl content:
- b. 1.7–2.5 parts by weight of a blocked isocyanate;

II. about 3 parts by weight of the coating composition of an aromatic solvent containing:
- a. 1 part by weight of a semi-refined coal tar distillate characterized by distillation of 10 percent to not below 165° C, 70 percent to not above 190° C, and 95 percent to not above 235° C;
- b. about 2 parts by weight of said distillate of cresylic acid; and
- c. about 1 part by weight of xylene; and

III. 0.1 to 10.0% by weight of said resin mixture of a catalyst to promote the reaction of the imidized polyester with the blocked isocyanate.

3,988,284
REINFORCED THERMOPLASTICS

Rolf Wurmb, Heidelberg; Joachim Kunde, Frankenthal; Dieter Stein, Limburgerhof; Hermann Gausepohl, Mutterstadt, and Rainer Theysohn, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Jan. 3, 1975, Ser. No. 538,454
Claims priority, application Germany, Jan. 18, 1974, 2402277
Int. Cl.² C08K *5/01;* **C08L** *77/00*
U.S. Cl. 260—33.6 UB **1 Claim**

1. Thermoplastic polycondensates and polyadducts selected from the group consisting of polyamides, polyesters, polycarbonates, polyurethanes, and polyoxymethylenes, said polycondensates and polyadducts containing from 10 to 60% by weight of conventional reinforcing agents and also an addition of from 0.05 to 2% by weight of a styrene oligomer.

3,988,285

PROCESS FOR THE ADDITION OF ADDITIVES TO THERMOPLASTICS

Christiaan G. De Vrieze, Schinnen, Netherlands, assignor to Stamicarbon B.V., Geleen, Netherlands

Filed Mar. 4, 1975, Ser. No. 555,273

Claims priority, application Netherlands, Mar. 5, 1974, 7402925

Int. Cl.[2] C08K *5/01*

U.S. Cl. 260—33.6 PQ 7 Claims

1. In a process for adding to a molten thermoplastic resin or to a solution of a thermoplastic resin one or more solid additives having a melting point of up to 250° C and which are selected from the group consisting essentially of heat-stabilizers, anti-oxidants, UV-stabilizers, internal or external lubricants, antistatic agents, antiblocking agents, corrosion-inhibitors, and mixtures thereof, which are solid additives and have a melting point of at most 250° C, the improvement comprising

a. mixing the said one or more additives with a mineral oil which is an aliphatic white oil being substantially non-volatile under the conditions of processing the thermoplastic and having a Redwood No. 1 ranging from between 45 and 105 seconds, wherein the aliphatic white oil is at least 10% by weight of the total amount of the additives mixed with said aliphatic white oil and wherein the amount by weight of mineral oil is at most three times the weight of the additive and wherein the amount of each of said one or more additives is at most 1% by weight of said thermoplastic resin.

b. heating said mixture to form a melt at temperatures below the melting point of the solid additive.

c. adding said melt to a thermoplastic, which is molten or in solution.

3,988,286

HEAT CURABLE POLY(ARYLENE SULFIDE) COMPOSITIONS

James T. Edmonds, Jr., and Harold Wayne Hill, Jr., both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 23, 1974, Ser. No. 500,181

Int. Cl.[2] C08L *81/02*

U.S. Cl. 260—37 R 17 Claims

1. A heat curable poly(arylene sulfide) blend composition exhibiting enhanced cure rates and enhanced thermal stability properties in comparison with poly(arylene sulfides) without alkyl groups which comprises

a. an arylene sulfide homopolymer free of alkyl substituents in the polymer chain and

b. an arylene sulfide copolymer having in the polymer chain 1–50 mole percent alkyl-substituted monomeric cyclic repeating units and 99–50 mole percent monomeric cyclic repeating units free of alkyl substituents with the further proviso that the amount of said copolymer present in the blend is sufficient to provide 1–40 mole percent alkyl-substituted cyclic repeating units in the total blend.

3,988,287

POLYAMIDE COMPOSITIONS

Norio Inokuchi, and Tomoyoshi Ono, both of Hino, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Jan. 24, 1975, Ser. No. 544,004

Claims priority, application Japan, Feb. 9, 1974, 49-15873; June 14, 1974, 49-67099

Int. Cl.[2] C08L *43/04, 77/06, 77/10*

U.S. Cl. 260—37 N 18 Claims

1. In a polyamide composition comprising a polyamide, from 5 to 70 percent by weight, based on the total composition of an inorganic filler selected from the group consisting of talc, clay, mica, silica, quartz, alumina, calcium silicate, calcium carbonate, wollastonite, asbestos and carbon black, and a treating agent for improving the compatability of said polyamide and inorganic filler, the improvement comprising a treating agent consisting essentially of from 0.025 to 7 percent by weight, based on the total composition of (a) a compound containing an unsaturated double bond and an epoxy group in one molecule and from 0.015 to 4 percent by weight, based on the total composition of (b) an unsaturated organic silane wherein said compound (a) having an unsaturated double bond and an epoxy group in one molecule and said unsaturated organic silane (b) are present in the heat-polymerized state in the composition.

3,988,288

POWDER PAINT

Kazuhiko Yamauchi, Amagasaki; Minoru Murakami, Toyonaka, and Hisashi Nakano, Takaishi, all of Japan, assignors to Kawakami Paint Mfg. Co. Ltd., Japan

Continuation-in-part of Ser. No. 282,833, Aug. 11, 1972, abandoned. This application Aug. 21, 1974, Ser. No. 499,159

Claims priority, application Japan, Aug. 24, 1971, 46-64565

Int. Cl.[2] C08G *51/04, 45/14*

U.S. Cl. 260—37 EP 24 Claims

1. A powder paint comprising:

a. an aminopolyester resin having a softening point of from about 50° C to about 200° C and being the elevated temperature reaction product of:

i. a polyester resin comprising a reaction product of at least one dihydric, trihydric or tetrahydric alcohol and at least one acid, greater than 50 mol % of said acid component consisting of at least one member selected from the group consisting of terephthalic acid, isophthalic acid and the lower alkyl esters thereof; and

ii. from 0.2 to 15% by weight of said polyester, of an amino compound; and

b. a polyepoxide compound, wherein the weight ratio of the aminopolyester resin to the polyepoxide is from about 99:1 to about 1:1.

3,988,289

MOLDING COMPOSITIONS OF A RESIN AND HYDRATED CEMENT

Jeri O. Clark, Granville; Bobby J. Hankins, and Walter D. Cottrell, Jr., both of Newark, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Aug. 11, 1975, Ser. No. 603,427

Int. Cl.[2] C08L *3/30, 61/10*

U.S. Cl. 260—38 17 Claims

1. An uncured moldable composition comprising a phenolic resin and hydrated cement,

wherein the phenolic resin and hydrated cement have a weight ratio of resin to cement ranging from 1:9 to 9:1 based on the weight of hydrated cement and on resin solids,

wherein the hydrated cement has a total water content of at least 2 percent by weight, and

wherein the resin is a phenol-formaldehyde condensate or a phenol-amino compound-formaldehyde condensate.

3,988,290

COBALTIC PROMOTERS IN UNSATURATED POLYESTER RESIN SHEET MOLDING AND BULK MOLDING COMPOUND

Melville W. Uffner, Glen Mills, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Apr. 30, 1975, Ser. No. 572,957

Int. Cl.[2] C08L *67/00, 67/06*

U.S. Cl. 260—40 R 24 Claims

1. In a process for preparing a molding compound comprising mixing an unsaturated polyester resin with an unsaturated monomer, soluble and copolymerizable therewith, and chemically thickening with a Group II metal oxide or hydroxide, the improvement for extending the shelf life while providing en-

hanced cure rate at the molding temperature for said molding compound which comprises:

incorporating at least an effective proportion of a cobaltic promoter having a valence of 3 and soluble in said molding compound for selectively extending the shelf life and enhancing the cure rate of said molding compound.

3,988,291

PRECISION-MOLDABLE ABRASION-RESISTANT MOLDING COMPOSITION AND MOLDINGS

Maurice G. Knoy, Lafayette, Ind.; Robert E. Wilkinson, Birmingham, Mich., and Kenneth W. Johansen, Lafayette, Ind., assignors to Rostone Corporation, Lafayette, Ind.

Filed May 27, 1975, Ser. No. 580,768

Int. Cl.² C08K *3/34;* **C08L** *67/06*

U.S. Cl. 260—40 R **21 Claims**

1. A molding composition adapted to undergo thermosetting reaction under molding conditions to produce a molding having both low-shrink characteristics and high abrasion resistance, comprising from 15% to 60% by weight of a low-profile resin system containing a free-radical initiated thermosetting polymer, a free-radical initiator therefor, a copolymerizable monomer, and a thermoplastic resin low-shrink additive,

from about 5% to about 40% of long fiber asbestos, such asbestos constituting substantially the entire fiber content of the composition,

from about 20% to about 80% of other mineral filler, not including any substantial amount of glass fiber, and

from about one-half percent to about 10% of an abrasion-improving additive consisting of a polyolefin which is solid at room temperature.

3,988,292

GAS-FADE INHIBITOR AND ANTI-GAS-FADE POLYMER COMPOSITION

Hiroyuki Moriga, Takatsuki; Tadao Morishita, Kobe; Toshihiko Shinoda, and Isamu Takahashi, both of Iwakuni, all of Japan, assignors to Teijin Limited, Osaka, Japan

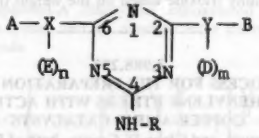
Division of Ser. No. 334,202, Feb. 21, 1973, abandoned. This application June 10, 1975, Ser. No. 585,591

Claims priority, application Japan, Feb. 24, 1972, 47-19054

Int. Cl.² C08K *5/34*

U.S. Cl. 260—45.8 NT **19 Claims**

1. An anti-gas-fade polymer composition which consists essentially of a polymer selected from the group consisting of polyurethanes and cellulose acetates and not more than 10% by weight, based on the polymer, of an inhibitor which is a triazine derivative of the following formula:



wherein X and Y are the same or different and each represent a member selected from the group consisting of -N<, —S— and —O—, and wherein when X is -N<, n is 1, when X is —S— or —O—, n is zero, when Y is -N<, m is 1, and when Y is —S— or —O—, m is zero; each of A, B and R is a member selected from the group consisting of alkyl groups having 1 to 18 carbon atoms, alkenyl groups having 3 to 18 carbon atoms, cycloalkyl groups having 3 to 6 carbon atoms, a benzyl group, chloro-substituted benzyl groups, cyanoalkyl groups having 3 to 5 carbon atoms, dialkylamino groups having 2 to 8 carbon atoms, a phenylamino group, a phenyl group, and halogen or C_{1-4} alkyl substituted phenyl groups, with the proviso that A, B and R do not represent a phenyl group or substituted phenyl group at the same time, and that when each of X and Y is —S— or —O—, R is not a phenyl group or substituted phenyl group; each of D and E is a member selected from the group consisting of a hydrogen atom and the same groups as represented by A, B and R, A and E or B and D may together form a morpholino, piperazino, or piperidino group together with X and Y, when both of E and D are groups other than a hydrogen atom, R is not a phenyl group or substituted phenyl group, when only E is a hydrogen atom, both A and R are not phenyl groups or substituted phenyl groups, and when only D is a hydrogen atom, both B and R are not phenyl groups or substituted phenyl groups; and the sum of the number of carbon atoms contained in A, B, D, E and R is at least 10.

3,988,293

STABILIZER SYSTEM FOR POLYOLEFINS

Kenneth R. Mills, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 216,296, Jan. 7, 1972, abandoned. This application May 28, 1975, Ser. No. 581,516

Int. Cl.² C08K *5/32*

U.S. Cl. 260—45.8 R **9 Claims**

1. A method for stabilizing an olefin polymer against deterioration in the presence of ultraviolet radiation which comprises the addition of a stabilizing amount of 2-hydroxy-4-n-octoxybenzophenone in combination with a stabilizing amount of distearyl pentaerythritol diphosphite.

3,988,294

SURFACE COATING COMPOSITIONS CONTAINING ANTIMICROBIC UREAS

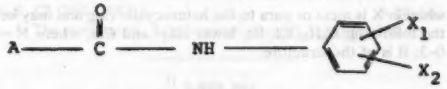
Harry Elwyn Hill, Wallingford, Conn., assignor to R. T. Vanderbilt Company, Inc., Norwalk, Conn.

Continuation-in-part of Ser. No. 449,693, March 11, 1974, abandoned. This application Mar. 2, 1976, Ser. No. 663,078

Int. Cl.² C08K *5/34, 5/32, 5/21*

U.S. Cl. 260—45.8 N **13 Claims**

1. An improved surface coating composition comprising a binder normally subject to microbial attack selected from the group consisting of oleoresinous binders, synthetic linear addition polymer binders or combinations of the two, and a biologically active compound of the formula:



wherein X_1 and X_2 respectively represent halogens having an atomic number from 9 to 35 and A is an amino radical selected from the group, consisting of dialkylamino having 1 to 3 carbon atoms in each alkyl group; (3-dibutylaminopropyl) amino when X_1 and X_2 are in the 2,5 position; (3-piperidinopropyl)amino when X_1 and X_2 are in the 2,3 or 3,4 position and methylmethoxyamino when at least one of X_1 and X_2 is bromine, said biologically active compound being in sufficient amount to inhibit the growth of microorganisms on the dry film formed from said surface coating composition.

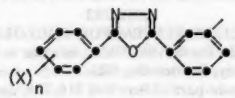
3,988,295

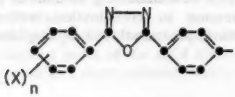
ORGANIC COMPOSITIONS STABILIZED WITH BENZOXAZOLE OR OXADIAZOLE COMPOUNDS

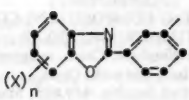
Gether Irick, Jr.; Charles A. Kelly, both of Kingsport, and James C. Martin, Johnson City, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

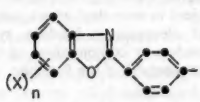
Division of Ser. No. 298,040, Oct. 16, 1972, Pat. No. 3,864,354. This application July 1, 1974, Ser. No. 484,723
Int. Cl.² C08K 5/00
U.S. Cl. 260—45.8 NZ 11 Claims

1. An organic composition susceptible to ultraviolet light degradation stabilized against such degradation with a stabilizing amount of at least one compound having the formula A and B or A and C wherein A is of the structure:

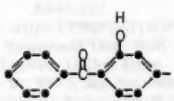




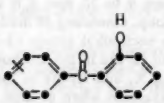




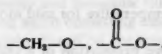
wherein X is meta or para to the heterocyclic ring and may be the following: C_6H_5, Cl, Br, lower alkyl and CN, where N = 0–3; B is of the structure:



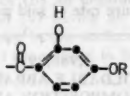
or



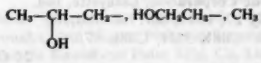
wherein the radical bond is either meta or para to the carbonyl group, A and B being linked through a group selected from



and —O—; and C is of the structure:



wherein R is



where $n' = 2–18$, A and C being linked through a carbon-carbon bond.

3,988,296

CHLORINATED OLEFIN POLYMER COMPOSITIONS STABILIZED WITH ANTIMONY TRIOXIDE

James R. Bethea, Denham Springs; Robert G. Bryan, Jr., and S. Douglas Stain, Jr., both of Baton Rouge, all of La., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 474,507, May 30, 1974, abandoned. This application Jan. 9, 1975, Ser. No. 539,891
Int. Cl.² C08K 5/03, 5/59
U.S. Cl. 260—45.75 B 5 Claims

1. A composition of matter having an oxygen index value of at least about 20 as determined by ASTM Test No. D-2863 and a tensile impact strength of at least about 20 p.s.i. as determined by ASTM Test No. D-1822-61T after aging 14 days at a temperature of 120° C. said composition consisting essentially of a substantially uniform admixture of (1) a resinous material consisting of a normally solid, linear olefin polymer powder having a bulk density of from about 22 to about 36 pounds/cubic foot the individual particles thereof being predominantly in the range of from at least 300 to about 800 microns in size said olefin polymer containing from about 1 to about 20 percent by weight of chlorine chemically combined therewith said chlorine being substantially heterogeneously distributed along the outer surfaces of said particles and wherein the chlorination is accomplished by reacting the non-chlorinated olefin polymer with gaseous chlorine in the substantial absence of oxygen at temperatures not substantially exceeding 90° C. while holding said olefin polymer in a fluidized bed state, and (2) from about 0.1 to about 10 percent of antimony trioxide based on the weight of (1).

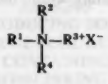
3,988,297

PROCESS FOR THE PREPARATION OF POLYPHENYLENE ETHERS WITH ACTIVATED COPPER-AMINE CATALYSTS

James G. Bennett, and Glenn D. Cooper, both of Delmar, N.Y., assignors to General Electric, Pittsfield, Mass.

Filed July 3, 1974, Ser. No. 485,741
Int. Cl.² C08G 67/00, 65/42
U.S. Cl. 260—47 ET 25 Claims

1. In a process for the preparation of a high molecular weight polyphenylene ether having a degree of polymerization of at least 50 by oxidatively coupling a monovalent phenol having substitution in at least the two ortho positions and hydrogen or halogen in the para-position, using an oxygen-containing gas and a complex catalyst comprising a copper salt and an amine as an oxidizing agent in the presence of a separate aqueous phase the improvement which comprises including in said complex catalyst an effective amount of an ammonium salt or a mixture of ammonium salts up to 0.2 mol percent, of the formula:



wherein R^1, R^2, R^3 and R^4 are selected from the group consisting of alkyl, alkenyl and aralkyl radicals of from 1–24 carbon atoms and X^- is an anion.

3,988,298

CATALYST REMOVAL FROM POLYPHENYLENE OXIDES BY AMMONIA AND CARBON DIOXIDE

Daniel Edwin Floryan, Glenmont, N.Y., assignor to General Electric, Pittsfield, Mass.

Filed May 12, 1975, Ser. No. 576,678

Int. Cl.² C08G *65/44*

U.S. Cl. 260—47 ET **12 Claims**

1. In a process for forming a polyphenylene ether resin by an oxidative coupling reaction in the presence of a complex copper-amine catalyst comprising passing an oxygen-containing gas through a reaction solution of a phenol and said catalyst, the improvement which comprises separating said catalyst by contacting the reaction solution with an aqueous solution of carbon dioxide and ammonia and thereafter separating the polyphenylene ether resin from the reaction mixture.

3,988,299

ANAEROBIC ADHESIVE COMPOSITION HAVING IMPROVED STRENGTH AT ELEVATED TEMPERATURE CONSISTING OF UNSATURATED DIACRYLATE MONOMER AND MALEIMIDE ADDITIVE

Bernard M. Malofsky, Bloomfield, Conn., assignor to Loctite Corporation, Newington, Conn.

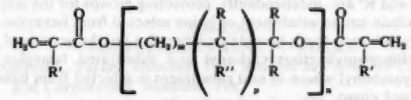
Continuation-in-part of Ser. No. 513,609, Oct. 10, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,666

Int. Cl.² C09J *5/00*

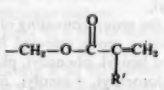
U.S. Cl. 260—47 UA **12 Claims**

1. A composition curable by heat and having improved thermal properties comprising a mixture of

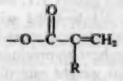
a. a monomer selected from the group consisting of ethoxylated bisphenol-A diacrylate, ethoxylated bisphenol-A dimethacrylate, and an acrylate ester corresponding to the formula



wherein R represents a radical selected from the group consisting of hydrogen, lower alkyl of 1–4 carbon atoms, inclusive, hydroxy alkyl of 1–4 carbon atoms inclusive, and

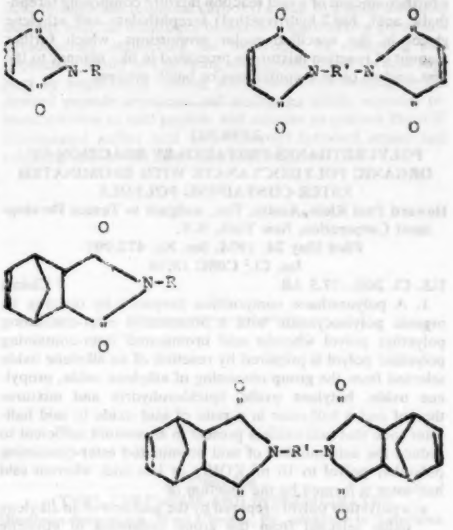


R′ is a radical selected from the group consisting of hydrogen, halogen, and lower alkyl of 1–4 carbon atoms; R″ is a radical selected from the group consisting of hydrogen, —OH and



m is an integer equal to at least 1; *n* is an integer equal to at least 1; and *p* is 0 or 1;

b. about 1 to about 5 percent by weight of the total composition of an additive selected from the group consisting of



wherein R and R′ are selected from the group consisting of alkyl, cycloalkyl, aralkyl, alkaryl.

3,988,300

BENZOPHENONE UREAS AND METHOD FOR UTILIZING THE SAME

Barrington Cross, Rocky Hill, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 31, 1973, Ser. No. 365,807

Int. Cl.² C07C *127/19, 127/15;* **C07D** *211/06, 295/00*

U.S. Cl. 260—553 A **5 Claims**

1. The compound, 3-(p-benzoyl-phenyl)-1,1-dimethyl urea.

3,988,301

PROCESS FOR THE PREPARATION OF HIGH-MOLECULAR WEIGHT

Lambert Gaston Jeurissen, and Frans Antoon De Smedt, both of Edegem, Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Nov. 1, 1974, Ser. No. 520,221

Claims priority, application United Kingdom, Nov. 6, 1973, 51381/73

Int. Cl.² C08G *63/22*

U.S. Cl. 260—75 M **6 Claims**

1. A process for the production of high molecular weight polyethylene terephthalate wherein a reaction mixture comprising terephthalic acid and bis(2-hydroxyethyl) terephthal-

ate in a molar ratio of from 1:1 to 1.1:1, and ethylene glycol in a molar ratio of from 0.3:1 to 0.9:1 with respect to the terephthalic acid, is heated at a temperature between 240° and 310° C and in an inert atmosphere to produce a precondensate consisting of a low molecular weight esterification product; a first part of the precondensate thus formed is then polycondensed further at a temperature of from 260° to 300° C at subatmospheric pressure to form a high molecular weight linear polyethylene terephthalate, and a second part is mixed, as such or after pre-glycolisation with ethylene glycol to bis(2-hydroxyethyl) terephthalate, with polyethylene terephthalate scrap or with such scrap and with fresh terephthalic acid and/or ethylene glycol in such quantity or quantities as to form a further amount of a said reaction mixture comprising terephthalic acid, bis(2-hydroxyethyl) terephthalate and ethylene glycol in the specified molar proportions; which further amount of reaction mixture is processed in like manner to the first, and so on in a continuous or batch process.

3,988,302

POLYURETHANES PREPARED BY REACTION OF ORGANIC POLYISOCYANATE WITH BROMINATED ESTER-CONTAINING POLYOLS

Howard Paul Klein, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed May 24, 1974, Ser. No. 472,999
Int. Cl.² C08G *18/38*
U.S. Cl. 260—77.5 AR **5 Claims**

1. A polyurethane composition prepared by reacting an organic polyisocyanate with a brominated ester-containing polyether polyol wherein said brominated ester-containing polyether polyol is prepared by reaction of an alkylene oxide selected from the group consisting of ethylene oxide, propylene oxide, butylene oxide, epichlorohydrin and mixtures thereof and a half-ester in a ratio of said oxide to said half-ester such that said oxide is present in an amount sufficient to reduce the acid number of said brominated ester-containing polyether polyol to 10 ml KOH/g or less and, wherein said half-ester is formed by the reaction of

a. a polyether polyol prepared by the addition of an alkylene oxide selected from the group consisting of ethylene oxide, propylene oxide and mixtures thereof to a polyhydric compound selected from the group consisting of ethylene glycol, propylene glycol, the isomeric n-butylene glycols, 1,5-pentanediol, 1,6-hexanediol, glycerol, trimethylolpropane, 1,2,6-hexanetriol, sorbitol, sucrose, alpha-methyl glycoside, pentaerythritol, phosphorus acids and phosphorus acid esters having at least one reactive OH, and

b. 4,5-dibromohexahydrophthalic anhydride or its corresponding acid, wherein the mole ratio of polyether polyol (a) to 4,5-dibromohexahydrophthalic anhydride or its corresponding acid (b) is from 2:3 to about 3:1.

3,988,303

METHOD OF PREPARING POLYIMIDES

Vasily Vladimirovich Korshak, ulitsa Gubkina, 4, kv. 81; Svetlana Vasilievna Vinogradova, ulitsa Miklukho-Maklaya, 30, korpus 2, kv. 63; Yakov Semenovich Vygodsky, ulitsa Novatorov, 36, korpus 9, kv. 38, and Zinaida Vasilievna Geraschenko, Profsojuznaya ulitsa, 102, korpus 6, kv. 25, all of Moscow, U.S.S.R.

Filed Dec. 23, 1974, Ser. No. 535,854
Int. Cl.² C08G *73/16*
U.S. Cl. 260—78 TF **7 Claims**

1. A method of preparing a film- and fiber-forming polyimide comprising the polycondensation of a diamine and a dianhydride of a tetracarboxylic acid in the presence of a catalyst, consisting of a carboxylic acid employed in an amount of from 0.25 to 10 COOH groups per one unit of the polyimide, in a polar organic solvent medium inert with respect to the starting diamine and dianhydride and immiscible with water, at a temperature within the range of from 100° to 220° C.

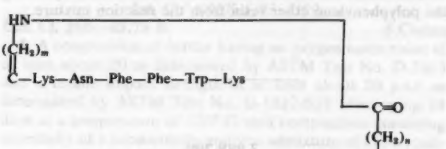
3,988,304

CYCLIC DODECAPEPTIDE DERIVATIVES OF SOMATOSTATIN AND INTERMEDIATES THEREOF

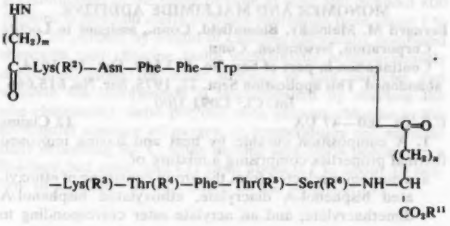
Victor M. Garsky, Havertown, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,303
Int. Cl.² C08G *69/44*; C07C *103/52*
U.S. Cl. 260—78 A **12 Claims**

1. A compound selected from the group consisting of



and



and pharmaceutically acceptable salts thereof, wherein:

R^2 and R^3 are, independently, protecting groups for the side chain amino substituent of lysine selected from benzyloxycarbonyl, tosyl, t-amyloxycarbonyl, t-butyloxycarbonyl, diisopropylmethoxycarbonyl and substituted benzyloxycarbonyl where in said substituent is selected from halo and nitro;

R^4, R^5 and R^6 are selected from the group consisting of hydrogen and a protecting group for the alcoholic hydroxyl group of threonine and serine selected from acetyl, benzoyl, tert-butyl, trityl, benzyl, 2,6 dichlorobenzyl and benzyloxycarbonyl;

R^{11} is selected from the group consisting of hydrogen and an α-carboxyl protecting group selected from C_1–C_6 alkyl, benzyl, substituted benzyl, phenacyl, phthalimidomethyl, benzhydryl, trichloroethyl, 4-picolyl, β-methylthioethyl, 4-(methylthio)phenyl, said substituent of benzyl being selected from nitro, methyl and methoxy; and

Each of *m* and *n* is an integer of from 1 through 5, inclusive; and all chiral amino acids are of the L-configuration.

3,988,305

METHOD OF PRODUCING SOLUBLE GLYCOL METHACRYLATE OR GLYCOL ACRYLATE POLYMERS AND COPOLYMERS CONTAINING A MINOR AMOUNT OF DIESTER CROSSLINKING COMONOMERS

Miroslav Štol; Vladimír Stoy, and Zdeněk Tuzar, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation of Ser. No. 297,389, Oct. 13, 1972, abandoned. This application Jan. 2, 1975, Ser. No. 538,154

Claims priority, application Czechoslovakia, Oct. 14, 1971, 7233-71

Int. Cl.² C08F *218/00, 220/00, 222/00, 224/00*

U.S. Cl. 526—79 18 Claims

1. A method of preparing hydrophilic polymers of monomethacrylates and monoacrylates and mixtures thereof completely soluble in lower aliphatic alcohols comprising forming a starting monomer mixture I consisting essentially of a major portion of (1) a monoester of methacrylic or acrylic acids and mixtures thereof and (2) a minor amount of cross-linking comonomers of the corresponding multifold ester of said unit (1), and polymerizing said mixture under conditions of free radical polymerization in the presence of a diluent II to precipitate a hydrophilic polymer product therefrom, said diluent II being a solvent for all of the components of said starting mixture I but not a solvent or swelling agent for the polymer product produced and being selected from the group consisting of aromatic hydrocarbons, halogenated aromatic or aliphatic hydrocarbons, partially hydrogenated aromatic hydrocarbons, esters of aliphatic and aromatic carboxylic acid ethers, cycloethers, ketones and cycloketones, silicones, silicone oils and mixtures thereof, said starting mixture I being gradually combined with said diluent II during the polymerization thereof at such an amount and at such a rate that the unpolymerized concentration of the cross-linking unit (2) is maintained during polymerization under the critical limit of 0.02% by volume, based on the entire volume of the starting mixture I and diluent II so combined, said hydrophilic polymer product being thereby a dry powder substantially uncrosslinked and completely soluble in lower aliphatic alcohols but not in said diluent.

3,988,306

POLYCHLOROPRENE POWDERS

Nathan L. Turner, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Apr. 28, 1975, Ser. No. 571,957

Int. Cl.² C08F *6/22*

U.S. Cl. 528—493 13 Claims

1. A process for producing particulate polychloroprene comprising preparing a polychloroprene latex using a resin or rosin soap emulsification system,

acidifying said latex to a pH in the range of 5.5 to 6.3,

dissolving in said latex 1 to 10 parts by weight of an alkyl sulfate salt having 6 to 20 carbon atoms, said parts by weight of alkyl sulfate being based on 100 parts polychloroprene,

intimately mixing said latex with a coagulant solution and

recovering particulate polychloroprene and drying said particles.

3,988,307

SOLID PHASE SYNTHESIS OF PEPTIDES WITH CARBOXYL-TERMINAL AMIDES

Erhard Gross, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Sept. 6, 1974, Ser. No. 503,817

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 13, 1976

Int. Cl.² C07C *103/52*; C07G *7/00*

U.S. Cl. 260—112.5 R 10 Claims

1. A method of synthesizing peptides by solid phase procedure which comprises attaching an α,β-unsaturated amino acid through the teriminal carboxyl group to a solid insoluble support with the α-nitrogen blocked by a protecting group and subsequently unblocking the α-nitrogen by removing said protecting group and growing the peptide chain on said support by sequentially adding amino acids conforming to the desired peptide sequence and adding an acidic aqueous release solution to said peptide and support to convert the α,β-unsaturated amino acid to a carboxyl terminal amide and releasing said amide from said solid support.

3,988,308

(TYR³, TYR¹⁴)-SRIF AND INTERMEDIATES

Dimitrios Sarantakis, West Chester, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Nov. 4, 1974, Ser. No. 520,514

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² C07C *103/52*; A61K *37/00*

U.S. Cl. 260—112.5 R 4 Claims

1. A compound selected from those of the formula:

L-Ala-Gly-L-Tyr-L-Lys-L-Asn-L-Phe-L-Phe-L-Trp-L-Lys-L-Thr-L-Phe-L-Thr-L-Ser-L-Tyr-OH (I)

and

R-L-Ala-Gly-L-Tyr(R^1)-L-Lys(R^2)-L-Asn-L-Phe-L-Phe-L-Trp-L-Lys(R^3)-L-Thr(R^4)-L-Phe-L-Thr(R^5)-L-Ser(R^6)-L-Tyr(R^7)-X (II)

and the non-toxic salts thereof, wherein:

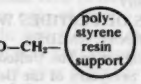
R is selected from the class consisting of H and an α-amino protecting group;

R^1 and R^7 are selected from the class consisting of hydrogen and a protecting group for the phenolic hydroxyl group of tyrosine selected from tetrahydropyranyl, tert-butyl, trityl, benzyl, 2,6-dichlorobenzyl, benzyloxycarbonyl and 4-bromobenzyloxycarbonyl;

R^2 and R^3 are selected from the class consisting of hydrogen and a side chain amino protecting group;

R^4, R^5 and R^6 are selected from the class consisting of hydrogen and a protecting group for the alcoholic group selected from acetyl, benzoyl, tert-butyl, trityl, benzyl and benzyloxycarbonyl; with the proviso that at least one of R, R^1, R^2, R^3, R^4, R^5, R^6 and R^7 is other than hydrogen;

X is selected from the class consisting of hydroxy, methoxy and



wherein said polystyrene is cross linked through the phenyl group on each second carbon atom of the alkyl chain of said polystyrene.

3,988,309

EEL CALCITONIN

Tetsuo Matsuda; Susumu Watanabe, both of Shizuoka; Shunpei Sakakibara, Suita; Eisuke Munekata, Toyonaka; Tadanori Morikawa, Takatsuki; Masaru Otani, Shizuoka; Toshiharu Noda, Toyonaka; Hirose Yamauchi, Shizuoka; Tosio Meguro, Shizuoka, and Shuichi Kitazawa, Shizuoka, all of Japan, assignors to Toyo Jozo Kabushiki Kaisha, Japan

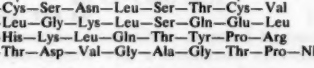
Filed Dec. 17, 1974, Ser. No. 536,889

Claims priority, application Japan, Dec. 27, 1973, 48-144250; July 17, 1974, 49-81138

Int. Cl.² C07C *103/52;* **C07G** *7/00*

U.S. Cl. 260—112.5 T **1 Claim**

1. A polypeptide selected from the group consisting of a compound of the formula



and salts thereof with pharmaceutically acceptable acids.

3,988,310

REACTIVE DYESTUFFS CONTAINING A SUBSTITUTED 1-METHYL OR 1-ETHYL PYRAZOLYL RADICAL

Klaus Gerlach, Cologne-Flittard; Horst Jager, and Georg Dehmel, both of Cologne-Buccheim, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

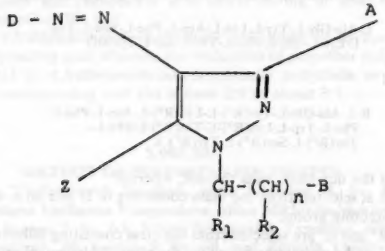
Filed Aug. 15, 1969, Ser. No. 850,634

Claims priority, application Germany, Aug. 17, 1968, 1795162

Int. Cl.² C09B *62/08, 62/16, 62/24, 62/50*

U.S. Cl. 260—154 **4 Claims**

1. Reactive dyestuff of the formula



in which A is selected from the group consisting of hydrogen, methyl, phenyl, lower carbalkoxy, N-alkyl- and N,N-dialkyl where alkyl has 1–4 carbon atoms - carboxamide, N-hydroxy ethylcarboxamide, carboxamide, and carboxy; B is selected from the group consisting of carboxy, lower carbalkoxy, N-alkyl and N,N-dialkyl- where alkyl has 1–4 carbon atoms-carboxamide, N-hydroxy ethyl- and N,N-dihydroxy ethyl- carboxamide, carboxamide, and nitrile, Z is selected from the group hydroxy and amino, R_1 and R_2 are selected from the group methyl and hydrogen, D stands for the radical of a diazo component containing a fiber reactive group, said fiber reactive group being a group reactive to amide and hydroxyl containing fibers, said radical of a diazo component being bound by a cyclic aromatic carbon atom to the azo group.

3,988,311

BASIC AZO DYESTUFFS CONTAINING A HETEROCYCLIC DIAZO COMPONENT AND A PARA-N-TERTIARY OR QUATERNARY HETEROCYCLIC AMINE ALKYLENE AMINO BENZENE COUPLING COMPONENT

Gert Hegar, Schoenenbuch, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

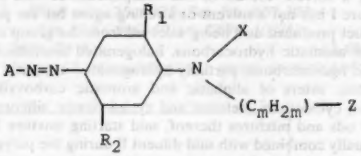
Continuation of Ser. No. 219,874, Jan. 21, 1972, abandoned, which is a division of Ser. No. 883,629, Dec. 9, 1969, Pat. No. 3,658,781, which is a continuation-in-part of Ser. No. 639,008, May 17, 1967, abandoned. This application Apr. 9, 1974, Ser. No. 459,517

Claims priority, application Switzerland, May 23, 1966, 7377/66; Mar. 8, 1967, 3390/67

Int. Cl.² C09B *29/36;* **D06P** *3/52, 3/76*

U.S. Cl. 260—158 **11 Claims**

1. A basic azo dyestuff of the formula



wherein

A is 5-nitrothiazolyl-(2)-, 5-cyanothiazolyl-(2)-, 1,2,4-triazolyl-(3)-, benzthiazolyl-(2)-, 6-lower alkyl-benzthiazolyl-(2)-, 6-lower alkoxy-benzthiazolyl-(2)-, 6-carbo-lower alkoxybenzthiazolyl-(2)-, 6-chlorobenzthiazolyl-(2)-, 6-lower alkylsulfonylbenzthiazolyl-(2), 6-nitrobenzthiazolyl-(2)-, thiazolyl-(2)-, 5-phenyl-1,3,4-thiadiazolyl-(2)-, 5-lower alkyl-1,3,4-thiadiazolyl-(2)-, 1,3,5-thiadiazolyl-(2)-, 4-phenyl-1,3,5-thiadiazolyl-(2)-, 4-lower alkyl-1,3,5-thiadiazolyl-(2)-, 4-lower aklyl-5-nitrothiazolyl-(2)-, 4-lower alkylthiazolyl-(2)-, 4-phenyl-thiazolyl-(2)-, 4-(4′-chlorophenyl)-thiazolyl-(2)-, pyridinyl-(3)-, quinolinyl-(3)-, pyrazolyl-(3)-, 1-phenylpyrazolyl-(3), indazolyl-(3), 6-cyanobenzthiazolyl-(2)-, or 1,3,4-thiadiazolyl-(2)-,

R_1 and R_2 are each selected from the group consisting of hydrogen, chlorine, lower alkyl and lower alkoxy,

X is selected from the group consisting of hydrogen, lower alkyl, cyclohexyl and a substituent of the formula

$$-(CH_2)_n-Y$$

wherein

Y is lower alkoxy, phenoxy, carbo lower alkoxy, lower alkanoyloxy, phenyl, hydroxy, cyano and cyano-lower alkoxy,

n is an integer of from 1 to 2,

m is an integer of from 2 to 3 and

Z is selected from the group consisting of unsubstituted or lower alkyl-substituted tertiary and quaternary morpholine, piperazine, quinoline, pyrimidine, thiomorpholine and pyrrolidine bound to the alkylene bridge via its nitrogen atom and containing, when quaternized, an anion of sulfuric, nitric, phosphoric, hydrochloric, hydrobromic, hydriodic trichlorozincic acid, benzenesulfonic acid, toluenesulfonic acid, methoxybenzenesulfonic acid, bromobenzenesulfonic acid, chlorobenzenesulfonic acid, methylenesulfonic acid, formic acid, acetic acid, chloroacetic acid, oxalic acid, lacetic acid, tartaric acid, or of benzoic acid, wherein "lower" means containing at most 4 carbon atoms.

3,988,312

TETRAKISAZO PIGMENTS PREPARED BY REACTING AN AMINOAZOBENZENE AND AN ARYL-BIS-ACETOACETYLAMINO DERIVATIVE

Armand Roueche, Bottmingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

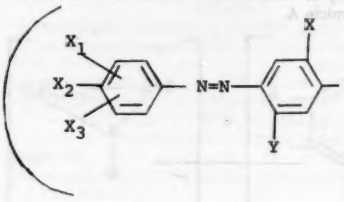
Continuation of Ser. No. 479,963, June 17, 1974, abandoned. This application June 24, 1975, Ser. No. 589,983

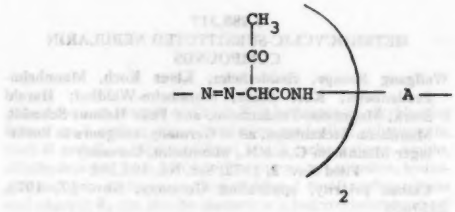
Claims priority, application Switzerland, June 21, 1973, 9025/73

Int. Cl.² C09B *31/30*, *35/50*; D06P *1/08*

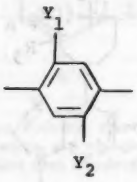
U.S. Cl. 260—166 6 Claims

1. A tetrakisazo pigment of the formula





wherein A denotes naphthylene or



X denotes hydrogen, chloro, alkyl containing 1–4 carbon atoms, alkoxy containing 1–4 carbon atoms, nitro, methoxycarbonyl, Y denotes hydrogen, chloro, bromo, alkyl containing 1–4 carbon atoms or alkoxy containing 1–4 carbon atoms, X_1 denotes hydrogen, chloro, alkyl containing 1–4 carbon atoms, alkoxy containing 1–4 carbon atoms, alkanoylamino containing 1–4 carbon atoms, nitro, nitrile, trifluoromethyl, methoxycarbonyl, phenoxy, aroylamino, X_2 and X_3 denote hydrogen, chloro, alkyl containing 1–4 carbon atoms, alkoxy containing 1–4 carbon atoms, nitro, trifluoromethyl, methoxycarbonyl, and Y_1 and Y_2 denote hydrogen, chloro, bromo, alkyl containing 1–4 carbon atoms, alkoxy containing 1–4 carbon atoms, nitro, nitrile, trifluoromethyl or alkoxycarbonyl containing 2–6 carbon atoms.

3,988,313

PROCESS FOR THE PRODUCTION OF FERMENTATION POLYSACCHARIDES HAVING A NON-FIBROUS STRUCTURE

Albert Bouniot, Bernier a Melle, France, assignor to Rhone-Poulenc S.A., Paris, France

Filed May 2, 1974, Ser. No. 466,462

Claims priority, application France, May 4, 1973, 73.16148

Int. Cl.² C08B *37/00*

U.S. Cl. 536—1 7 Claims

1. In a process for the preparation of a fermentation polysaccharide produced by fermentation with *Xanthomonas campestris* or *Arthrobacter viscosus* by precipitating the polysaccharide from the aqueous fermentation medium in which it has been produced by addition thereto of a watermiscible organic liquid in which the polysaccharide is insoluble and then drying and grinding the precipitated polysaccharide; the improvement which consists in washing the precipitated polysaccharide before it is dried with a washing liquid which is a mixture of water and an organic liquid miscible therewith selected from the class consisting of water-miscible lower alcohols, water-miscible aliphatic ketones and their mixtures in which the proportion of the organic liquid in the washing liquid is such that the polysaccharide product, after washing, drying and grinding, is obtained in the form of a powder consisting of small granules having good flow characteristics.

3,988,314

COMPOUND U-50,228, DERIVATIVES THEREOF, AND PROCESSES FOR PREPARATION

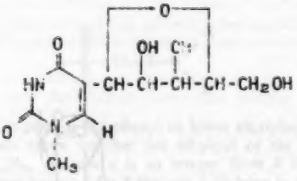
Alexander D. Argoudelis, Portage, and Stephen A. Mizsak, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 10, 1975, Ser. No. 621,306

Int. Cl.² C07H *3/02*

U.S. Cl. 536—1 7 Claims

1. Pure U-50,228, characterizable by the following structure:



3,988,315

ANTIBIOTICS ACLACINOMYCINS A AND B

Hamao Umezawa, Tokyo; Tomio Takeuchi, Tokyo; Masa Hamada, Hoya; Akira Takamatsu, Yokohama, and Toshikazu Oki, Kamakura, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

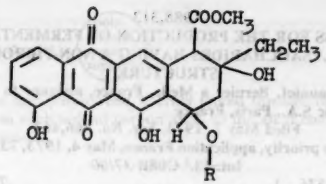
Filed July 16, 1975, Ser. No. 596,682

Claims priority, application Japan, July 27, 1974, 49-86390

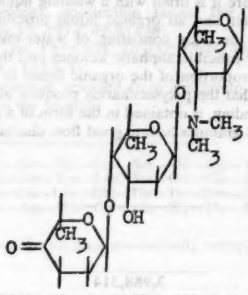
Int. Cl.² C07H *17/08*

U.S. Cl. 536—17 3 Claims

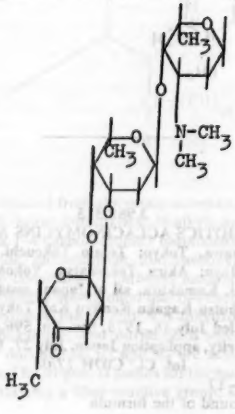
1. A compound of the formula



wherein R represents



or



3,988,316

ANTIBIOTICS SISOMICIN AND VERDAMICIN I AND COMPLEX CONTAINING SAME

Marvin J. Weinstein; Gerald H. Wagman, both of East Brunswick, and Joseph A. Marquez, Montclair, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 426,163, Dec. 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 208,907, Dec. 16, 1971, abandoned, which is a continuation-in-part of Ser. No. 58,050, July 24, 1970, abandoned. This application Feb. 18, 1975, Ser. No. 550,395

Int. Cl.[2] A61K *31/71*; C07H *15/22*

U.S. Cl. 536—17 7 Claims

1. A complex having antibiotic activity, said complex consisting essentially of Verdamicin I, sisomicin, Antibiotic G-418, and gentamicin A.

3,988,317

HETEROCYCLIC-SUBSTITUTED NEBULARIN COMPOUNDS

Wolfgang Kampe, Heddesheim; Klaus Koch, Mannheim-Feudenheim; Kurt Stach, Mannheim-Waldhof; Harald Stork, Mannheim-Feudenheim, and Felix Helmut Schmidt, Mannheim-Seckenheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany

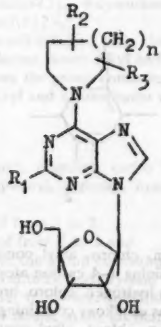
Filed Nov. 2, 1972, Ser. No. 303,290

Claims priority, application Germany, Nov. 17, 1971, 2157036

Int. Cl.[2] C07H *19/16*

U.S. Cl. 536—26 15 Claims

1. Nebularin compounds of the formula:



wherein R_1 is hydrogen, halogen or amino;

R_2 and R_3, which may be the same or different, are hydrogen, hydroxyl, lower alkyl, lower alkoxy or lower hydroxyalkyl; and

n is 2 or 3 or, when R_1 is a halogen atom or an amino group, n can also be 1; and the pharmacologically compatible salts thereof.

3,988,318

LOW MOLECULAR WEIGHT COMPLEXES OF LACTAMS AND POLYHYDROXY AROMATIC COMPOUNDS

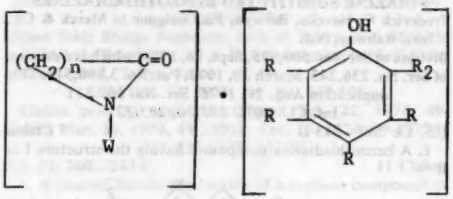
Joseph P. Copes, Easton, Pa., and David I. Randall, Leland, Mich., assignors to GAF Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 193,974, Oct. 29, 1971, abandoned. This application Oct. 10, 1974, Ser. No. 513,875

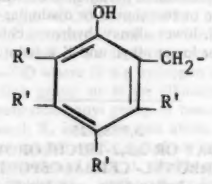
Int. Cl.² C07D 207/24, 210/00, 211/06

U.S. Cl. 260—239.3 R 12 Claims

1. A low molecular weight crystalline lactam.hydroxyphenol complex having the formula:



wherein *n* is an integer of 3 to 5; W is hydrogen or alkyl having from 1 to 8 carbon atoms, including cycloalkyl substituents; each R and R_2 is alkoxy of from 1 to 4 carbon atoms, amido, alkylhydroxy of from 1 to 4 carbon atoms, cyano, nitro, hydrogen, halogen, hydroxy or alkyl of from 1 to 10 carbon atoms and wherein R_2 can also be alaninyl or a hydroxybenzyl radical having the formula:



where R' is hydrogen, hydroxyl, cyano, halogen or alkyl of from 1 to 6 carbon atoms, and wherein at least one R is hydroxyl when R_2 is other than a hydroxyl or a hydroxybenzyl radical.

3,988,319

PROCESS FOR PRODUCING CAPROLACTAM FROM 6-AMINOCAPROIC ACID

Frantisek Mares, Whippany, N.J., assignor to Allied Chemical Corporation, New York, N.Y.

Filed Sept. 16, 1974, Ser. No. 506,148

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² C07D 201/08

U.S. Cl. 260—239.3 A 3 Claims

1. In a process of converting 6-aminocaproic acid, dissolved in methanol or ethanol, to epsilon caprolactam the improvement comprising dissolving said acid in solvent containing at least 60 percent by volume of ethanol, methanol or a mixture thereof, under conditions such that no substantial reaction occurs prior to complete dissolution; and thereafter maintaining the resulting solution at temperature in the range of 170°–200°C.

3,988,320

SINGLE STAGE RESOLUTION/RACEMIZATION OF α-AMINO-ε-CAPROLACTAM

Stylianos Sifniades, Madison; William J. Boyle, Jr., Warren, and Jan F. Van Peppen, Chester, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 484,529, July 1, 1974, Pat. No. 3,941,776. This application Apr. 7, 1975, Ser. No. 565,911

The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.

Int. Cl.² C07D 223/08

U.S. Cl. 260—239.3 R 12 Claims

1. A process for effecting transformation of D,L-α-amino-ε-caprolactam complex with nickel(II) chloride to L-α-amino-ε-caprolactam complex with nickel(II) chloride which comprises:

a. forming a supersaturated solution of said complex by mixing α-amino-ε-caprolactam with nickel(II) chloride and with nickel(II) hydroxide or nickel(II) alkoxide, in a solvent selected from C_1 C_4 alkanols and mixtures thereof, at a temperature below 120° C. and in proportions such that the molar ratio of α-amino-ε-caprolactam to nickel(II) is at least 3 and the molar ratio of hydroxide or alkoxide to nickel(II) is at least 0.01;

b. containing said solution with seed crystals of L-α-amino-ε-caprolactam complex with nickel(II) chloride; and

c. removing the grown crystals of said complex.

3,988,321

SUBSTITUTED DICHLOROSULFENAMIDES AND THEIR MANUFACTURE

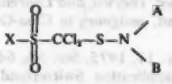
Wendell Gary Phillips, Olivette, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. Nos. 355,836, April 30, 1973, Pat. No. 3,888,925, and Ser. No. 159,034, July 1, 1971, Pat. No. 3,766,172. This application Jan. 28, 1975, Ser. No. 544,733

Int. Cl.² C07D 295/22, 223/04, 207/48, 211/96

U.S. Cl. 260—239 B 2 Claims

1. A substituted dichlorosulfenamide of the formula



wherein X is phenyl, halophenyl or lower alkylphenyl and A and B when taken together are alkylene of the empirical formula C_nH_{2n} wherein n is an integer from 4 through 8, inclusive, and having from 4 through 8 carbons in a continuous chain between the nitrogen terminal valence bonds.

3,988,322

STEROIDS EFFECTIVE AGAINST HEAVY-METAL POISONING

Tibor Kekesy, Czako; Szabolcs Szeberenyi, Pasareti; Gyorgy Beer, Karinthy; Antal Dudas, Rudas; Gyorgy Hajos, Martirok; Laszlo Szporny, Szabolcska, and Eva Czajlik nee Csizer, Sodras, all of Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

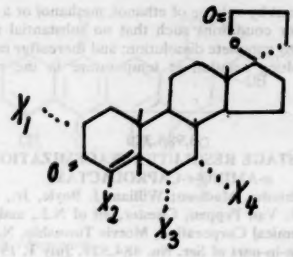
Filed June 20, 1974, Ser. No. 481,466

Claims priority, application Hungary, July 9, 1973, RI 514

Int. Cl.² C07J 21/00

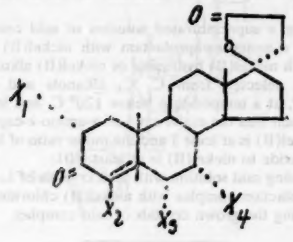
U.S. Cl. 260—239.57 10 Claims

1. A compound of the formula:



wherein X_1 is hydrogen or acetylthio, X_2 is acetylthio and X_3 and X_4 form a valence bond.

8. A compound of the formula:



wherein

X_1 and X_2 are each hydrogen or bromo;

X_3 is bromo;

X_4 is hydrogen or acetylthio, or X_3 and X_4 together form a valence bond, provided that at least one of X_1, X_2 and X_3 is bromo.

3,988,323

METAL COMPLEXES OF BISHYDRAZIDES

Francois L'Eplattenier, Therwil, and Laurent Vuitel, Monthey, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

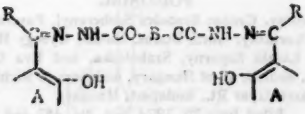
Filed Dec. 12, 1975, Ser. No. 640,374

Claims priority, application Switzerland, Dec. 17, 1974, 16813/74

Int. Cl.² C09B 55/00; C07D 215/02; C07C 119/00

U.S. Cl. 260—240 G **11 Claims**

1. 1:1- and 2:1-metal complexes of bishydrazides of the formula I



(I)

wherein A represents a hydrocarbon radical selected from the group consisting of benzene or naphthalene or a heterocyclic radical selected from the group consisting of pyridine, pyrimidine, pyrazole, quinoline, isoquinoline or coumarin, and B represents a benzene or naphthalene radical, whereby the radical A can also be substituted by halogen atoms, hydroxy, alkyl, aryl, alkoxy, nitro, cyano, carboxy, alkoxycarbonyl, carbamoyl or alkyl or aryl carbamoyl groups, and the radical B by halogen atoms, alkyl, aryl or alkoxy groups, R represents a hydrogen atom where A is a heterocyclic radical or a hydrogen atom or methyl group where A is a hydrocarbon radical, and the complexing metal ions are bivalent ions of zinc, cobalt, nickel or copper.

3,988,324

3-DIAZINE SUBSTITUTED BENZOTHIADIAZINES

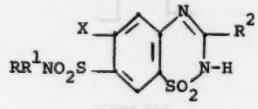
Frederick C. Novello, Berwyn, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 509,975, Sept. 26, 1974, which is a division of Ser. No. 236,243, March 20, 1972, Pat. No. 3,890,313. This application Aug. 29, 1975, Ser. No. 609,111

Int. Cl.² C07D 285/20, 285/22

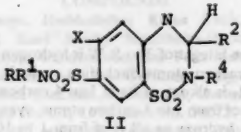
U.S. Cl. 260—243 D **7 Claims**

1. A benzothiadiazine compound having the structure I or II



I

or



II

and pharmacologically acceptable salts thereof wherein R is hydrogen or lower alkyl; R^1 is hydrogen or lower alkyl; R^2 is pyrimidinyl or a substituted pyrimidinyl derivative wherein the substituent is one or two similar or dissimilar groups selected from lower alkyl, lower alkoxy, hydroxy, chloro and bromo; R^4 is hydrogen or lower alkyl; and X is halo, lower alkyl and trifluoromethyl.

3,988,325

7-CARBOXY OR 2,2,2-TRICHLOROETHOXY CARBONYL- CEPHALOSPORINS

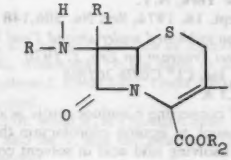
Wayne A. Spitzer, Indianapolis, and Ian G. Wright, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed July 3, 1972, Ser. No. 268,367

Int. Cl.² C07D 501/60

U.S. Cl. 260—243 C **3 Claims**

1. A compound of the formula



wherein R is hydrogen or an acyl group selected from the group consisting of C_2–C_7 alkanoyl, thienylacetyl and furylacetyl; R_1 is carboxy or 2,2,2-trichloroethoxycarbonyl and R_2 is hydrogen or 2,2,2-trichloroethyl.

3,988,326

PROCESS FOR N-ACYLATION OF 7 AMINO CEPHEM COMPOUNDS

Shigeo Seki; Shingo Sugimoto, both of Tokyo, and Shokichi Nakajima, Yokohama, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

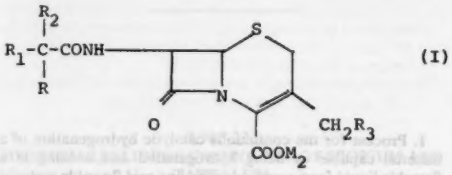
Filed Feb. 13, 1975, Ser. No. 549,807

Claims priority, application Japan, Feb. 22, 1974, 49-20420; Mar. 20, 1974, 49-31001; Apr. 16, 1974, 49-41776

Int. Cl.² C07D 501/06

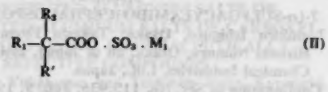
U.S. Cl. 260—243 C 11 Claims

1. A process for the production of a cephem compound of the formula



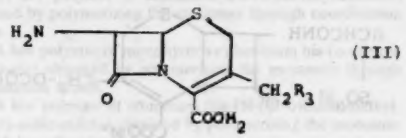
(I)

wherein R is a hydrogen atom; a free or protected amino group of the formula —NHA where A is a hydrogen atom or a known amino-protecting group; a carboxyl or carboxylate group of the formula —COOB where B is a hydrogen atom or an alkali metal or ammonium cation; a formamido group of the formula —NHCHO; or a free or protected hydroxyl group of the formula —OD where D is a hydrogen atom or a known hydroxyl-protecting group or is an alkanoyl group of 1–6 carbon atoms, benzylcarbonyl group or benzoyl, chlorobenzoyl or nitrobenzoyl: R_1 is a hydrogen atom; an alkyl of 1–4 carbon atoms or phenoxy-(C_{1-4})alkyl or phenylthiomethyl group; phenyl, halophenyl, (C_{1-4}) alkylthiophenyl, (C_{1-4})alkoxycarbonylaminophenyl, methoxybenzyloxyaminophenyl, benzoyloxyphenyl, an alkoxyl of 1–4 carbon atoms; phenoxy group; benzyloxy group; a cycloalkyl group of 4–6 carbon atom; a cycloalkenyl group of 4–6 carbon atoms; an alkylthio group of 1–4 carbon atoms; phenylthio or benzylthio group; pyridylthio group; cyano group; azido group; tetrazolyl or 1,2,3-oxadiazolidine-4-on-3-yl group or thienyl or methylthienyl, ethylthienyl, furyl, methylfuryl or ethylfuryl group; or naphthyl group: R_2 is a hydrogen atom or phenyl group: or R_1 and R_2 taken together with the carbon atom attached to both R_1 and R_2 form a cycloalkyl of 4–6 carbon atoms: or R_1 and R_2 taken together form a C_{2-4}-alkylidene or benzylidene group: R_3 is a hydrogen atom; acetoxy group; azido group; cyano group; a C_{1-4}-alkoxyl group; benzoyloxy group; benzyloxy group; a C_{1-4}-alkylthio group; phenylthio group; benzylthio group; or (5-methyl-1,3,4-thiadiazolyl)-thio, 1-methyl-1H-tetrazole-5-ylthio, 2-methyl-1,3,4-oxadiazole-5-ylthio, pyridine-1-oxide-2-ylthio or 2-carboxymethyl-1,3,4-triazole-5-ylthio group: and M_2 is an alkali metal cation, an ammonium cation or a hydrogen atom, which comprises reacting a compound of the formula



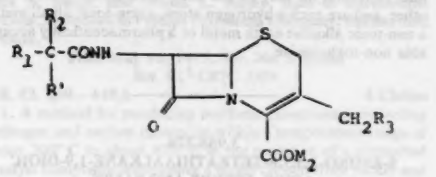
(II)

wherein R_1 and R_2 are each as defined above, R′ is the same as R provided that R′ should be a hydrogen atom or the group other than the free amino or free hydroxyl group, and M_1 is an alkali metal or ammonium cation, with a 7-amihocephalosporanic acid derivative of the formula



(III)

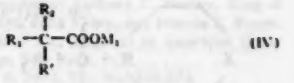
wherein R_3 and M_2 are each as defined in the above, in a homogeneous aqueous solution of these two reactants, to prepare a reaction product of the formula



(I′)

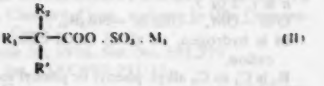
wherein R′, R_1, R_2, R_3 and M_2 are each as defined in the above.

7. A process as claimed in claim 1 in which the cephem compound of the formula (I′) is produced by reacting a carboxylate compound of the formula



(IV)

wherein R′, R_1 and M_1 are each as defined in the claim 1, with a mixture of dimethylformamide and sulfur trioxide to prepare a solution in dimethylformamide of the acylating agent of the formula



(II)

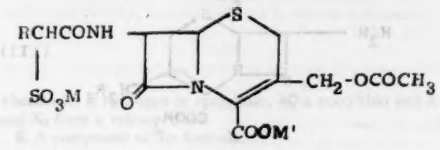
so formed and wherein R′, R_1, R_2 and M_1 are each as defined in the claim 1, and then reacting said solution of the acylating agent of the formula (II) in dimethylformamide with an aqueous solution of a 7-aminocephalosporanic acid derivative of the formula (III), whereby said 7-aminocephalosporanic acid derivative is acylated with said acylating agent in the resulting homogeneous aqueous solution of these two reactants, to produce the cephem compound of the formula (I′) as the acylation product.

3,988,327
7-(α-SULFOACYLAMIDO)CEPHALOSPORANIC ACIDS

Toshihiro Ishiguro, Osaka; Takeshi Fugono, Hyogo, and Hiroaki Nomura, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan

Continuation of Ser. No. 113,935, Feb. 9, 1971, abandoned. This application Feb. 5, 1975, Ser. No. 547,169
Claims priority, application Japan, Feb. 11, 1970, 45-11620
Int. Cl.² C07D *501/32, 501/28*
U.S. Cl. 260—243 C 9 Claims

1. A compound represented by the following formula:



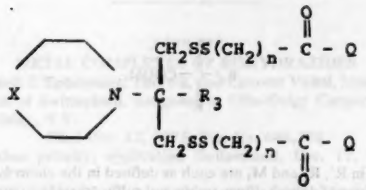
wherein
R is a hydrogen atom, alkyl having 1–6 carbon atoms or phenyl; M and M′ may be the same as or different from each other, and are each a hydrogen atom, a non-toxic alkali metal, a non-toxic alkaline earth metal or a pharmaceutically acceptable non-toxic amine.

3,988,328
5-AMINO-2,3,7,8-TETRATHIAALKANE-1,9-DIOIC ACIDS, ESTERS AND SALTS

Rupert Schneider, Riehen, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Aug. 20, 1974, Ser. No. 498,956
Claims priority, application Switzerland, Aug. 27, 1973, 12247/73
Int. Cl.² C07D *295/74;* C07C *149/20*
U.S. Cl. 260—247.1 R 19 Claims

1. A compound of the formula:

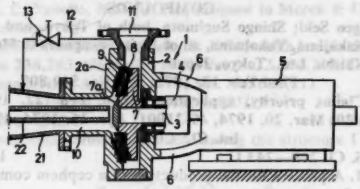


wherein X is oxygen, —NH—, —CH_2— or a direct covalent bond,
R_3 is hydrogen or C_1 or C_2 alkyl,
n is 1, 2 or 3,
Q is —OM, —OR_4 or —NR_5R_6,
M is hydrogen, an alkali metal cation or the ammonium cation,
R_4 is C_1 to C_8 alkyl, phenyl or phenyl mono-, di- or tri-substituted independently by fluoro, chloro, bromo, C_1 to C_5 alkoxy, phenoxy, carboxy, C_2 to C_6 alkoxycarbonyl or carboxamido,
R_5 is hydrogen, C_1 to C_5 alkyl, phenyl or phenyl mono-, di- or tri-substituted independently by fluoro, chloro, bromo, nitro, C_1 to C_5 alkoxy, phenoxy, carboxy, C_2 to C_6 alkoxycarbonyl or carboxamido,
R_6 is —NHR_7 or independently R_5, and
R_7 is hydrogen or C_1 to C_5 alkyl,
or an acid addition salt thereof.

3,988,329
PROCESS FOR CONTINUOUS CATALYTIC HYDROGENATION

Friedrich J. Zucker, Norf, Germany, assignor to Hans Heinrich Auer, Rodenkirchen, Germany

Filed Dec. 18, 1974, Ser. No. 533,886
Claims priority, application Germany, Dec. 21, 1973, 2363886
Int. Cl.² C11C *3/12;* C07B *1/00;* B01J *8/00*
U.S. Cl. 260—409 9 Claims



1. Process for the continuous catalytic hydrogenation of a material capable of being hydrogenated and existing in a flowable liquid form comprising feeding said flowable material together with a hydrogen-containing gas into a substantially axially symmetrical reaction zone, subjecting said material and hydrogenating gas in the presence of a hydrogenation catalyst in said reaction zone to high shearing forces and, in rapid succession, to a series of compressions and expansions, said shearing forces and rapid succession of compressions and expansions being caused by the action of circular and coaxially inter-engaging rows of teeth in said reaction zone, said rows of teeth being caused to move at a small spacing from one another.

3,988,330
HIGH MOLECULAR WEIGHT ESTERS OF C_{22+} α-OLEFIN DERIVED ACIDS

Harold C. Foulks, Jr., Newport, Ky.; Herbert G. Rodenberg, and Harold E. Mains, both of Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio

Filed Oct. 23, 1974, Ser. No. 517,332
Int. Cl.² C08H *3/00;* C09F *5/08;* C11C *3/02*
U.S. Cl. 260—410.6 6 Claims

1. An ester derived from an aliphatic hydroxylic compound having 2 to 25 carbon atoms and 1 to 10 primary or secondary hydroxyl groups and a mixed straight-chain aliphatic monocarboxylic acid obtained by the ozonization of a C_{22+} α-olefin wherein at least 90% by weight of the olefins contain 22 or more carbon atoms, said mixed acid containing less than 30% by weight acids having fewer than 21 carbon atoms, less than 20% by weight acids having greater than 35 carbon atoms and 55% by weight or more $C_{21\text{-}35}$ acids with the weight ratio of odd to even carbon content acids in the $C_{21\text{-}35}$ range being between 1.5:1 and 10:1.

3,988,331

PROCESS FOR THE MANUFACTURE OF HIGH MOLECULAR WEIGHT ALIPHATIC MONOCARBOXYLIC ACIDS

Helmut Korbanka, Adelsried, and Werner Strassberger, Gersthofen, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 318,671, Dec. 26, 1972, abandoned. This application Apr. 4, 1975, Ser. No. 565,007

Claims priority, application Germany, Dec. 31, 1971, 2165858

Int. Cl.² C11C *1/00*; C07C *51/00*

U.S. Cl. 260—413 2 Claims

1. Process for the manufacture of high molecular weight, aliphatic monocarboxylic acids by oxidizing alpha-olefins with a yield of from 90 to 95% by weight of the alpha-olefin employed, which consists essentially of treating straight-chained alpha-olefins having 16 to 70 carbon atoms in the molecule or mixtures of such alpha-olefins in the liquid state, without addition of any other substances or solvents at a temperature of from 100° to 115° C with aqueous chromosulfuric acid containing per liter 300 to 650 grams sulfuric acid and 50 to 140 grams chromium trioxide, the chromosulfuric acid being used in an amount such that 10 to 40 moles of chromium trioxide are present per 3 moles of alpha-olefin to be oxidized.

3,988,332

HYDROCARBYLIDENE COMPOUNDS OF NIOBIUM AND TANTALUM

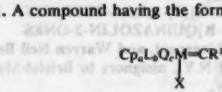
Richard Royce Schrock, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 471,810, May 20, 1974, abandoned. This application Apr. 21, 1975, Ser. No. 570,259

Int. Cl.² C07F *9/00*

U.S. Cl. 260—429 R 10 Claims

1. A compound having the formula



wherein

Cp is π-cyclopentadienyl having up to one alkyl substituent;

L is $P(R^3)_3$ or $(R^3)_2PCH_2CH_2P(R^3)_2$ in which R^3 is alkyl or aryl;

Q is alkyl, aralkyl or diarylmethyl in which the β-carbon is not bonded to hydrogen;

M is niobium or tantalum;

X is F, Cl, Br, I or alkyl, aralkyl or diarylmethyl in which the β-carbon is not bonded to hydrogen;

R^1 and R^2 individually are hydrogen, tertiary alkyl or aryl, only one of R^1 and R^2 being tertiary alkyl;

alkyl has 1–10 carbons, aralkyl has 7–10 carbons and aryl, including the aryl groups in diarylmethyl, has 6–10 carbons;

a, *b* and *c* individually are 0, 1 or 2;

with the proviso that *b* is 1 when L is a diphosphine or 2 when L is a monophosphine; and

with the further provisos that

when *a* is 2, *b* and *c* are each 0;

when *a* is 1, *b* is 1 or 2, *c* is 1, Q and X are each CH_3 and R^1 and R^2 are each H; and

when *a* is 0, *b* is 0, *c* is 2 and X is the same as Q.

3,988,333

TRI-SUBSTITUTED ALUMINUM SALTS OR DI-SUBSTITUTED ALUMINUM SALTS OF CARBOXYL GROUP-CONTAINING, PHARMACEUTICALLY EFFECTIVE COMPOUNDS

Yasushi Suzuki, Yokohama, and Toshihisa Itaya, Kawasaki, both of Japan, assignors to Teikoku Hormone Mfg. Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 236,347, March 20, 1972, Pat. No. 3,865,857. This application Nov. 26, 1974, Ser. No. 527,415

Int. Cl.² C07F *5/06*

U.S. Cl. 260—448 R 3 Claims

1. A low polymer of aluminum tris-(o-acetoxybenzoate) obtained by polymerizing the monomer through coordination bonds.

2. A low polymer of monohydroxy aluminum bis-(o-acetoxybenzoate) obtained by polymerizing the monomer through coordination bonds.

3. A low polymer of aluminum tris-[N-(3′-trifluoromethylphenyl)-anthranilate] obtained by polymerizing the monomer through coordination bonds.

3,988,334

METHOD FOR METHANATION

Jack N. Finch, and Dennis L. Ripley, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 16, 1975, Ser. No. 578,056

Int. Cl.² C07C *1/04*

U.S. Cl. 260—449.6 4 Claims

1. A method for producing methane comprising contacting hydrogen and carbon monoxide within a temperature range of about 200° C to about 450° C in the presence of a supported catalyst composite comprising a metal chosen from nickel and cobalt in an amount in the range of about 5 to about 20 weight percent of the catalyst composite; with the catalyst further promoted by a noble metal of Group VIII of the Periodic Table in an amount in the range of about 0.05 to about 5 weight percent of the catalyst composite; and a Group VIB metal in an amount in the range of from about 10 to about 60 weight percent of the catalyst composite.

3,988,335

1-SUBSTITUTED-6-(2-SUBSTITUTED AMINOETHOXY)XANTHEN-9-ONES

Arthur A. Santilli, Havertown; Anthony C. Scotese, King of Prussia; Stanley C. Bell, Penn Valley, and Marvin E. Rosenthale, Havertown, all of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed May 8, 1974, Ser. No. 468,052

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² C07D *405/12*

U.S. Cl. 260—247.7 T 4 Claims

1. 1-Hydroxy-6-(2-morpholinoethoxy)xanthen-9-one.

3,988,336

PREPARATION OF DIHALOISOCYANURIC ACID SALTS

John A. Wojtowicz, Cheshire, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed June 30, 1975, Ser. No. 591,579

Int. Cl.² C07D *251/12*

U.S. Cl. 260—248 C 12 Claims

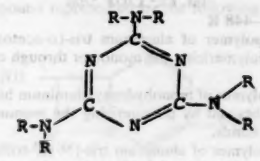
1. A process for producing a dihaloisocyanuric acid salt which comprises reacting a gaseous mixture containing a dihalogen monoxide and an inert gas with a solid monometal cyanurate selected from the group consisting of a monoalkali metal cyanurate, or a monoalkaline earth metal dicyanurate, said gaseous mixture being comprised of from about 1 percent to about 30 percent by volume of said dihalogen monoxide, and recovering said dihaloisocyanuric acid salt produced thereby.

3,988,337
SUBSTITUTED TRIAMINO-S-TRIAZINES

Thirumurti L. Narayan, Riverview, and Moses Cenker, Trenton, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 19, 1974, Ser. No. 534,436
Int. Cl.² C07D 251/64
U.S. Cl. 260—249.6 5 Claims

1. As a composition of matter, a triazine corresponding to the formula:



wherein R is either alkyl having from one to six carbon atoms, 2-hydroxyalkyl having from two to six carbon atoms in the alkyl portion, or $(R')_2N—R''$ wherein R' is alkyl from one to six carbon atoms and R'' is alkylene having from two to 10 carbon atoms, and

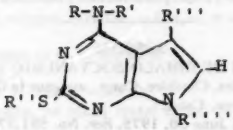
wherein at least one R must be 2-hydroxyalkyl and at least one R must $-[3(R')_2N—R''$

3,988,338
4-SUBSTITUTED AMINO-2-SUBSTITUTED THIO-PYRROLO-[2,3-D]PYRIMIDINE DERIVATIVES

Folke Skoog, Madison; Ruth Y. Schmitz, Middleton, both of Wis.; Sidney M. Hecht, and Robert B. Frye, both of Cambridge, Mass., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Apr. 24, 1974, Ser. No. 463,739
Int. Cl.² C07D 487/04
U.S. Cl. 260—256.5 R 10 Claims

1. A compound having the general formula



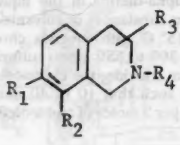
in which R and R' are selected from the group consisting of hydrogen, branched and linear chain $C_1 - C_{10}$alkyl, $C_2 - C_{10}$ alkenyl, and $C_3 - C_{10}$ cycloalkyl, benzyl, phenyl, naphthyl, pyrimidyl, pyridyl and pyrrole, and hydroxy, chloro and bromo substituents of said group, but in which no more than one of the groups R and R' is hydrogen, R'' is a group as defined for R and R' and R''' and R'''' are groups selected from the group consisting of hydrogen and a group as defined for R and R'.

3,988,339
PHARMACEUTICAL COMPOSITIONS AND METHODS OF INHIBITING PHENYLETHANOLAMINE N-METHYLTRANSFERASE

Carl Kaiser, Haddon Heights, N.J., and Robert G. Pendleton, Philadelphia, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 440,925, Feb. 8, 1974, Pat. No. 3,939,164. This application June 26, 1975, Ser. No. 590,772
Int. Cl.² A61K 31/47
U.S. Cl. 424—258 16 Claims

1. A pharmaceutical composition to inhibit phenylethanolamine N-methyltransferase comprising a pharmaceutical carrier and, in an effective amount to inhibit phenylethanolamine N-methyltransferase, a tetrahydroisoquinoline compound of the formula:



in which:

R_1 and R_2 are hydrogen, chloro, bromo, fluoro, iodo, trifluoromethyl, amino, lower alkyl, sulfamoyl, methylsulfamoyl, dimethylsulfamoyl or nitro, provided that R_1 and R_2 are not both hydrogen and provided that when one of R_1 and R_2 is amino or lower alkyl, the other is not hydrogen, amino or lower alkyl and

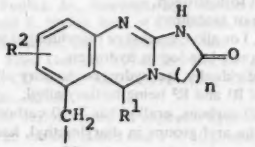
R_3 and R_4 are hydrogen, methyl or ethyl or a pharmaceutically acceptable, acid addition salt thereof.

3,988,340
6-ALKOXYMETHYL-1,2,3,5-TETRAHYDROIMIDAZO[2,1-B]QUINAZOLIN-2-ONES AND 7-ALKOXYMETHYL-6-[H]-1,2,3,4-TETRAHYDROPYRIMIDO[2,1-B]QUINAZOLIN-2-ONES

Richard Anthony Partyka, Liverpool, and Warren Neil Beverung, Jr., Minoa, both of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Filed Jan. 23, 1975, Ser. No. 543,386
Int. Cl.² C07D 487/04
U.S. Cl. 260—256.4 F 14 Claims

1. A compound having the formula



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in which R^1 is H, phenyl or (lower)alkyl, R is (lower)alkyl, R^2 is hydrogen, chloro, bromo, fluoro, CF_3, hydroxy, (lower)alkyl of 1 to 3 carbon atoms or (lower)alkoxy of 1 to 3 carbon atoms and *n* is an integer of 1 or 2; or a pharmaceutically acceptable acid addition salt thereof.

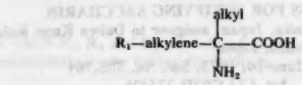
3,988,341

ESTERIFICATION PROCESS

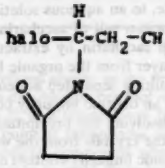
Walfred S. Saari, and Stella W. King, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

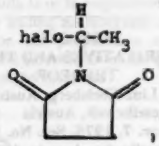
Filed June 25, 1974, Ser. No. 482,103
Int. Cl.[2] C07D 207/36
U.S. Cl. 260—281 GN 7 Claims

1. An esterification process which consists essentially of reacting (a) an α—NH_2 substituted carboxylic acid having the formula



wherein R_1 is hydrogen or an organic radical with (b) an alkylating agent selected from compounds having the formulae





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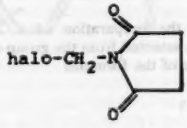

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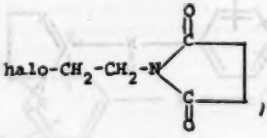

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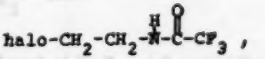

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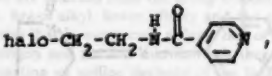

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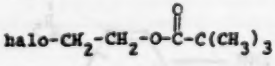

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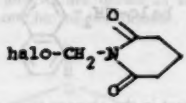
halo-CH_2-CH_2-halo

halo-CH_2-CH_2-CH_2-halo



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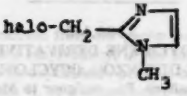
halo-H_2C-Saccharin,



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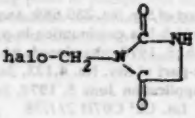

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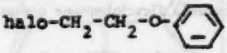

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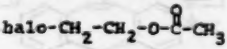

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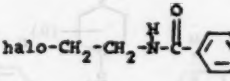

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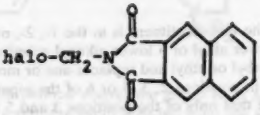

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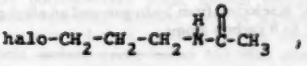

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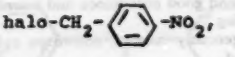
halo-CH_2-CH_2-S-CH_3 ,

halo-CH_2-CH_2-O-CH_3,



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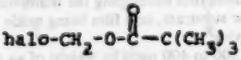

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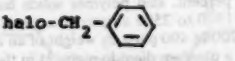
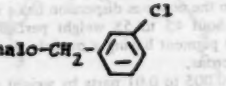
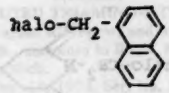




and



in an aprotic solvent in the absence of an acid binding agent whereby an ester of said acid is obtained with said -NH_2 group unalkylated.

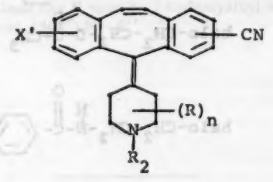
3,988,342

PIPERIDYLIDENE DERIVATIVES OF CYANO-5H-DIBENZO[a,d]CYCLOHEPTENE

John D. Prugh, Chalfont, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 280,685, Aug. 14, 1972, Pat. No. 3,960,872, which is a continuation-in-part of Ser. No. 9,049, Feb. 5, 1970, abandoned, which is a continuation-in-part of Ser. No. 4,123, Jan. 19, 1970, abandoned. This application June 5, 1974, Ser. No. 476,630
Int. Cl.² C07D 211/78
U.S. Cl. 260—293.62 2 Claims

1. A 5H-dibenzo[a,d]cycloheptene compound of the formula



wherein the CN substituent is in the 1-, 2-, or 3-position;

R_2 is lower alkyl or a lower alkenyl substituent;

R is methyl or ethyl and replaces one or more of the hydrogens in positions 2, 3, 5 or 6 of the piperidine ring, provided that only of the positions 3 and 5 is substituted in any one compound;

n is 0, 1 or 2; and

X′ is selected from hydrogen and an alkyl group having up to 6 carbon atoms.

3,988,343

COATING COMPOSITION FOR NON-WOVEN FABRICS

Marvin R. Lilyquist, Raleigh, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 31, 1974, Ser. No. 537,749
Int. Cl.² C08L 33/04
U.S. Cl. 260—29.6 MM 2 Claims

1. A durable label stock having good resistance to abrasion and cleaning and good acceptance and retention of printing inks, comprising

a. an autogenously bonded, nonwoven nylon fabric substrate, and

b. a continuous film enveloping the filaments of the nonwoven fabric substrate, said film being made from a composition having

1. about 200 to 400 parts by weight of an acrylic polymer latex having a solids content of from about 45 to 60 weight percent, said polymer solids having a particle size of 1500 to 2500 angstrom units,

2. about 200 to 400 parts by weight of an aqueous dispersion of a titanium dioxide pigment in the anatase form, wherein the aqueous dispersion has a solids content of from about 45 to 55 weight percent, said titanium dioxide pigment having a particle size less than about 0.2 microns,

3. about 0.005 to 0.01 parts by weight of a blue tinting pigment selected from the group consisting of Monastral Blue BT-284D, Color Index No. 74160 and Chromphtal Blue A3R, Color Index No. 69800,

4. about 0.007 to 0.015 parts by weight of a violet tinting pigment selected from the group consisting of Platinum Violet BP 273D, Color Index No. 60010 and Ergazine Violet 6RLT, Pigment Violet No. 30, and

5. about 1 to 3 parts by weight of an optical brightener based on stilbene naphthotriazole.

3,988,344

PROCESS FOR PURIFYING SACCHARIN

Kozo Nakaoji, Osaka, Japan, assignor to Daiwa Kasei Kabushiki Kaisha, Osaka, Japan

Filed June 10, 1975, Ser. No. 585,761
Int. Cl.² C07D 275/06
U.S. Cl. 260—301 6 Claims

1. A process for purifying saccharin comprising the steps of adding an extracting solvent selected from the group consisting of butyl acetate and a mixture of butyl acetate and ethyl acetate, where the volume of ethyl acetate does not exceed that of butyl acetate, to an aqueous solution of water-soluble metal salt or ammonium salt of saccharin to remove organic impurities from the saccharin by extraction, separating the resulting aqueous layer from the organic layer, concentrating and cooling the resulting separated aqueous layer to precipitate crystals having an organic impurity content of not higher then 120 p.p.m., dissolving the precipitated crystals in water and recrystallizing the crystals from the water to obtain saccharin having an organic impurity content of not higher then 10 p.p.m.

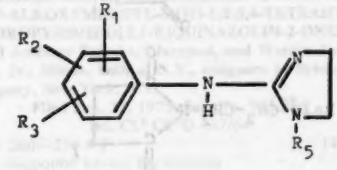
3,988,345

IMIDAZOLINE DERIVATIVES AND THE PREPARATION THEREOF

Rudolf Franzmair, Linz-Ebelsberg, Austria, assignor to Chemie Linz Aktiengesellschaft, Austria

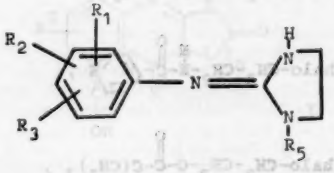
Filed Apr. 7, 1975, Ser. No. 565,762
Claims priority, application Austria, Apr. 5, 1974, 2854/74
Int. Cl.² C07D 49/34
U.S. Cl. 260—309.6 14 Claims

1. A process for the preparation of a 2-arylamino-2-imidazoline derivative selected from the group consisting of a compound having one of the formulas



(Ia)

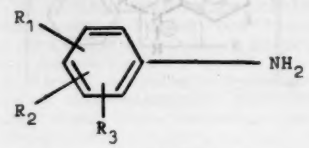
or



(Ib)

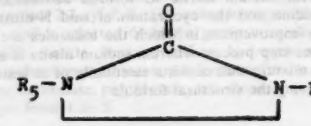
in which each of R_1, R_2 and R_3, which may be the same or different, are selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy and the nitro group, with the proviso that in every case at least one of R_1, R_2 and R_3 is not hydrogen and R_5 is selected from the group consisting of

benzoyl, methylbenzoyl- and ethylbenzoyl and an acid addition salt thereof which comprises reacting an aniline derivative of the formula



(II)

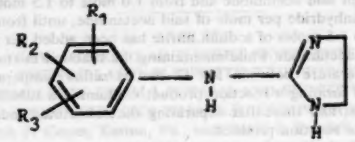
in which R_1, R_2 and R_3 are defined as above, with an 1-aroylimidazolidin-2-one having the formula



(III)

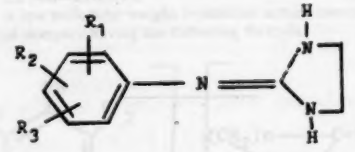
in which R_5 is as defined above, in the presence of at least 2 mols of phosphorus oxychloride per mol of the aniline derivative of the formula II, at a temperature from room temperature to the boiling point of phosphorus oxychloride and subjecting the intermediate compound after removing excess phosphorus oxychloride to mild hydrolysis, after which, the compounds of formula Ia or Ib respectively are isolated as free base or as a salt by adding an inorganic or organic acid.

4. A process for the preparation of a 2-arylamino-2-imidazoline derivative selected from the group consisting of a compound of one of the formulas



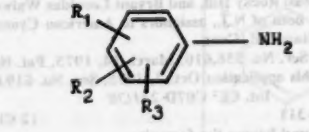
(Ic)

or



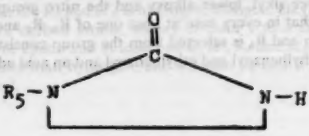
(Id)

in which each of R_1, R_2 and R_3, which may be the same or different, are selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy and the nitro group, with the proviso that in every case at least one of R_1, R_2 and R_3 is not hydrogen and an acid addition salt thereof, which comprises reacting an aniline derivate of the formula



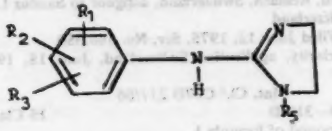
(II)

in which R_1, R_2 and R_3 are defind as above, with an 1-aroylimidazolin-2-one having the formula



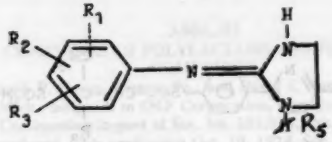
(III)

in which R_5 is selected from the group consisting of benzoyl, methylbenzoyl and ethylbenzoyl in the presence of at least 2 mols of phosphorus oxychloride per mol of the aniline derivative of the formula II, at a temperature from room temperature to the boiling point of phosphorus oxychloride and subjecting the intermediate compound obtained after removing excess phosphorus oxychloride to mild hydrolysis, after which in the resulting compound of the formulas



(Ia)

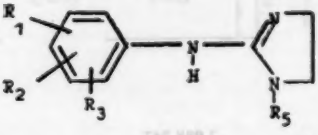
or



(Ib)

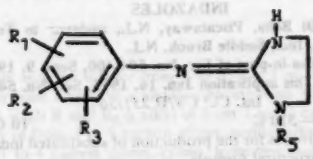
in which R_5 is as defined above, the group R_5 is split off by treatment with a splitting agent selected from the group consisting of lower aliphatic monoalcohols, mineral acids, monocarboxylic acids, polycarboxylic acids, sodium hydroxide solution, potassium hydroxide solution, salts of sodium or potassium, the aqueous solutions of which give an alkaline reaction, ammonia, amines, cyclic imines and akali alcoholates for more than one hour and the compounds of formula Ic or Id respectively are isolated as free base or as a salt by adding an inorganic or organic acid.

9. The compound selected from the group consisting of a compound having one of the formulas



(Ia)

or



(Ib)

in which each of R_1, R_2 and R_3, which may be the same or different, are selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy and the nitro group, with the proviso that in every case at least one of R_1, R_2 and R_3 is not hydrogen and R_5 is selected from the group consisting of benzoyl, methylbenzoyl and ethylbenzoyl and an acid addition salt thereof.

3,988,346

PYRAZOLINE COMPOUNDS USEFUL AS OPTICAL BRIGHTENERS

Horst Schmid, Reinach, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

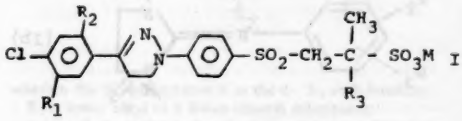
Filed June 12, 1975, Ser. No. 586,350

Claims priority, application Switzerland, June 18, 1974, 8311/74

Int. Cl.² C07D *231/06*

U.S. Cl. 260—310 D **15 Claims**

1. A compound of formula I,



wherein

R_1 is hydrogen or chlorine,

R_2 is hydrogen or methyl,

R_3 is hydrogen or C_{1-4}alkyl, and

M is hydrogen or a cation selected from the group consisting of alkali metal, alkaline earth metal and ammonium of the formula $R_5R_6R_7R_8N^+$ wherein R_5, R_6, R_7, and R_8, independently, signify hydrogen, alkyl of 1 to 3 carbon atoms or hydroxyalkyl of 2 to 4 carbon atoms.

3,988,347

PROCESS FOR THE PREPARATION OF SUBSTITUTED INDAZOLES

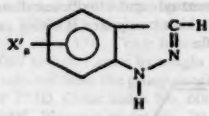
Eugene P. Di Bella, Piscataway, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Continuation-in-part of Ser. No. 504,400, Sept. 9, 1974, abandoned. This application Jan. 16, 1975, Ser. No. 541,673

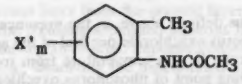
Int. Cl.² C07D *231/56*

U.S. Cl. 260—310 C **10 Claims**

1. In the process for the production of substituted indazoles having the structural formula



wherein X′ represents chlorine or nitro and *n* represents a number in the range of 1 to 4, by the reaction of a substituted o-toluidine with sodium nitrite to form a substituted N-nitroso-o-toluidine and the cyclization of said N-nitroso-o-toluidine, the improvement in which the indazoles are produced by a one-step process wherein sodium nitrite is added to a reaction mixture that consists essentially of at least one acetanilide having the structural formula



wherein X′ and *n* have the aforementioned significance, acetic acid, and acetic anhydride, said reaction mixture containing from 1 part to 20 parts by weight of acetic acid per part by weight of said acetanilide and from 1.0 mole to 1.5 moles of acetic anhydride per mole of said acetanilide, until from 1.0 mole to 1.5 moles of sodium nitrite has been added per mole of said acetanilide while maintaining the reaction mixture at a temperature between 50° C. and is reflux temperature, thereby forming a reaction product containing a substituted indazole, and thereafter separating the substituted indazole from the reaction product.

3,988,348

3- OR 5-AMINOPYRAZOLIUM SALTS

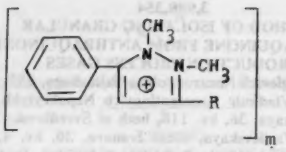
Barrington Cross, Rocky Hill, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 558,610, March 14, 1975, Pat. No. 3,941,881. This application Oct. 2, 1975, Ser. No. 619,093

Int. Cl.² C07D *231/38*

U.S. Cl. 260—311 **12 Claims**

1. A compound having the formula:



wherein R is a moiety represented by the structure:

$-NR_1R_2$

where R_1 and R_2 are a member selected from the group consisting of hydrogen, alkyl C_1-C_6, cycloalkyl C_3-C_6, benzyl, phenyl and 2,3-xylyl; X is an anion having a charge of from 1 to 3, and is selected from the group consisting of chloride, bromide, iodide, acetate, sulfate, hydrogen sulfate, methyl sulfate, benzene sulfonate, p-toluene sulfonate, nitrate, phosphate, carbonate, perchlorate, tetrafluoroborate; and m is an integer from 1 to 3.

3,988,349

SALTS OF N-FORMYL-6-CHLOROTRYPTOPHAN AND α-METHYL-p-NITROBENZYLAMINE

Clark William Perry, North Bergen, and Sidney Teitel, Clifton, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 404,951, Oct. 10, 1973, Pat. No. 3,901,915. This application May 15, 1975, Ser. No. 577,824

Int. Cl.² C07D *209/20*

U.S. Cl. 260—326.14 T **1 Claim**

1. The salt of N-formyl-D-6-chlorotryptophan with S(−)-α-methyl-p-nitrobenzylamine.

3,988,350

LOW MOLECULAR WEIGHT SUBSTITUTED PHENOL-LACTAM-SUBSTITUTED PHENOL COMPLEXES FROM LACTAMS AND SUBSTITUTED MONOHYDROXY PHENOLIC COMPOUNDS

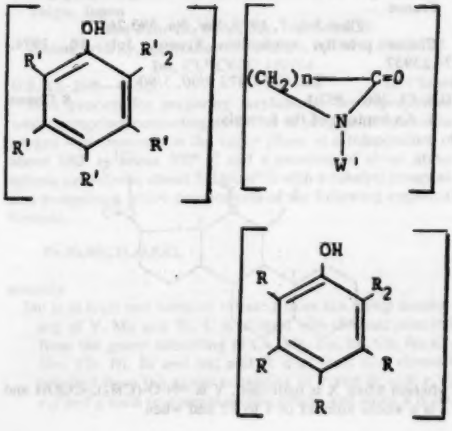
Joseph P. Copes, Easton, Pa., and David I. Randall, Leland, Mich., assignors to GAF Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 193,974, Oct. 29, 1971, abandoned. This application Oct. 10, 1974, Ser. No. 513,874

Int. Cl.² C07D *207/24, 210/00, 211/06*

U.S. Cl. 260—326.5 FL **10 Claims**

1. A low molecular weight crystalline lactam monohydroxy phenol complex having the following formula



wherein *n* is an integer of 3 to 5; W is hydrogen or alkyl having from 1 to 8 carbon atoms including cycloalkyl substituents; each R, R′, R_2 and R'_2 is hydrogen, halogen, alkyl having from 1 to 12 carbon atoms, alkoxy of from 1 to 3 carbon atoms, nitro, or cyano and at least one R, R′, R_2 and R'_2 is a substituent other than hydrogen; and wherein R_2 and R'_2 can also be alaninyl.

3,988,351

COMPLEXES OF POLYLACTAMS AND PHENOLIC COMPOUNDS

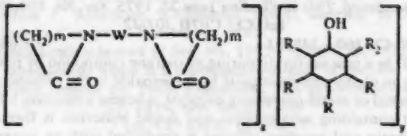
Joseph P. Copes, Easton, Pa., and David I. Randall, Leland, Mich., assignors to GAF Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 193,974, Oct. 29, 1971, abandoned. This application Oct. 10, 1974, Ser. No. 513,873

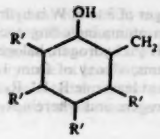
Int. Cl.² C07D *207/26*

U.S. Cl. 260—326.25 **22 Claims**

1. A dilactam-phenolic complex having the formula:



wherein *m* is an integer from 2 to 5; *z* is 1 or 2 and y is an integer from 1 to 4; W is alkylene having from 3 to 20 carbon atoms, each R and R_2 is alkyl of from 1 to 12 carbon atoms, alkoxy of from 1 to 4 carbon atoms, amido, alkyl hydroxy of from 1 to 4 carbon atoms, cyano, hydrogen, halogen, or hydroxyl, and wherein R_2 can also be also be alaninyl or



where each R′ is hydrogen, hydroxyl, halo, cyano, alkyl of from 1 to 6 carbon atoms or nitro.

3,988,352

DISUBSTITUTED XANTHONE CARBOXYLIC ACID COMPOUNDS

Jurg R. Pfister, Los Altos; Ian T. Harrison, and John H. Fried, both of Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 558,023, March 13, 1975, which is a division of Ser. No. 431,794, Jan. 8, 1974, Pat. No. 3,894,049, which is a continuation-in-part of Ser. No. 259,852, June 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 217,287, Jan. 12, 1972, Pat. No. 3,849,565. This application Dec. 4, 1975, Ser. No. 637,561

Int. Cl.² C07D *311/86*

U.S. Cl. 260—335 **2 Claims**

1. The compound 5-hydroxy-7-(methylthio)-xanthone-2-carboxylic acid.

2. The compound 5-methylthio-7-hydroxyxanthone-2-carboxylic acid.

3,988,353

PREFERENTIAL REMOVAL OF METALLIC CATALYST FROM EPOXIDATION EFFLUENT

John P. Schmidt, Princeton, N.J., assignor to Oxirane Corporation, Princeton, N.J.

Continuation-in-part of Ser. No. 457,840, April 4, 1974, abandoned. This application June 25, 1975, Ser. No. 590,290

Int. Cl.² C07D *301/32*

U.S. Cl. 260—348.5 L **7 Claims**

1. In a process for preparing an oxirane compound by reacting an olefin with an organic hydroperoxide in the presence of a metal or metal-containing cayalyst, wherein a reaction effluent containing said catalyst and acidic materials is formed, wherein said reaction effluent is contacted with an aqueous basic solution to form an aqueous phase and an organic phase, and wherein said aqueous and organic phases are separated, the improvement which comprises,

a. contacting said effluent with a quantity of an aqueous basic solution containing from about 1 to about 3 gram-equivalents of base therein per gram-equivalent of catalyst present in said effluent to remove preferentially from about 95 percent to about 98 percent by weight of said metallic catalyst from said reactor effluent and insufficient to remove more than about 20 percent by weight of the total organic acids and phenols from said reactor effluent, and

b. contacting the organic phase so separated with a quantity of an aqueous basic solution sufficient to neutralize acidic materials therein.

3,988,354

METHOD OF ISOLATING GRANULAR ANTHRAQUINONE FROM ANTHRAQUINONE PRODUCTION PROCESS GASES

Vladimir Georgievich Nazarov, ulitsa Belinskogo, 152, korpus 2, kv. 32; Vladimir Konstantinovich Nepokrytykh, ulitsa Belorechenskaya, 36, kv. 118, both of Sverdlovsk; Ljubov Markovna Vasilevskaya, ulitsa Ivanova, 30, kv. 4, Voroshilovgradskava oblast, Rubezhnoe; Natalya Dmitrievna Rusyanova, ulitsa 8 Marta, 7, kv. 3; Natalya Borisovna Volgina, ulitsa Gagarina 47, kv. 12, both of Sverdlovsk; Vitaly Fedorovich Chernyshev, ulitsa Lenina, 48, kv. 89, Sverdlovsk; Nina Alexandrovna Chetverikova, ulitsa Samoletnaya, 3, korpus 1, kv. 42, Sverdlovsk, Uktus, and Alexandr Stepanovich Kostromin, ulitsa Shartashskaya, 10, kv. 38, Sverdlovsk, all of U.S.S.R.

Continuation of Ser. No. 376,436, July 5, 1973, abandoned. This application Jan. 13, 1975, Ser. No. 540,700

Int. Cl.² C07C *49/68*

U.S. Cl. 260—369 **3 Claims**

1. In a method of isolating anthraquinone from a mixture of anthraquinone vapors and non-condensible gases by contacting the vapor-gas mixture with a cooled fluidized bed of anthraquinone granules, the improvement comprising isolating said anthraquinone in granular form by maintaining said fluidized bed at a temperature in the range of 110°–160° C and removing condensed anthraquinone granules thus formed from said fluidized bed at a rate and in a manner that the holding time of said condensed granules in said bed is not in excess of 24 hours.

3,988,355

SUBSTITUTED PHENYL AND NAPHTHYL ESTERS OF PGE_1

Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 431,599, Jan. 8, 1974. This application Dec. 12, 1974, Ser. No. 531,995

Int. Cl.² C07C *177/00*

U.S. Cl. 260—395 **3 Claims**

1. The ester of p-tritylphenol and PGE_1.

2. The ester of p-tritylphenol and 15-methyl-PGE_1.

3. The ester of p-tritylphenol and 15(R)-15-methyl-PGE_1.

3,988,356

NOVEL HAPTENES AND ANTIGENS

André Piérdet, Noisy-le-Sec, and Michel Vignau, Neuilly-sur-Seine, both of France, assignors to Roussel-UCLAF, Paris, France

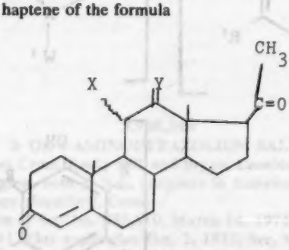
Filed July 7, 1975, Ser. No. 593,268

Claims priority, application France, July 10, 1974, 74.23937

Int. Cl.² C07J *9/00, 5/00*

U.S. Cl. 260—397.1 **8 Claims**

1. An haptene of the formula



wherein when X is hydrogen, Y is $=N\text{-}O\text{-}(CH_2)_a\text{-}COOH$ and a is a whole number of 1 to 12 and when

X is hemiterephthaloyloxy in the α- or β-position.

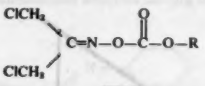
3,988,357

CERTAIN OXIME CARBONATES

Don Robert Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Jan. 20, 1975, Ser. No. 542,159
Int. Cl.² C07C 69/96
U.S. Cl. 260—463 4 Claims

1. A compound of the formula



in which R is alkyl having 1 to 6 carbon atoms.

3,988,358

PROCESS FOR THE PREPARATION OF CARBOXYLIC ACID ESTERS FROM ORGANIC HALIDES

Richard F. Heck, Wilmington, Del., assignor to The University of Delaware, Newark, Del.

Filed May 10, 1974, Ser. No. 468,762
Int. Cl.² C07C 67/36, 69/54, 69/78, 121/52
U.S. Cl. 260—465 D 8 Claims

1. The catalytic process of producing esters from aryl, heterocyclic, benzylic, vinylic and ethynylic halides, which comprises reacting said halide with an alcohol and carbon monoxide in the presence of a palladium catalyst selected from the group consisting of palladium metal and a palladium complex reducible to palladium in the zero valent state under the reaction condition and in the presence of a basic tertiary amine in a molar equivalent amount compared to the halide or in excess of that amount, said reaction being carried out at a temperature within the range of from 20° C to 175° C and at a pressure of about a half an atmosphere to 1000 atmospheres.

3,988,359

CATALYST FOR USE IN AND PROCESS FOR PREPARING ACRYLONITRILE

Shigeru Saito, Fuchu; Yutaka Sasaki, Yokohama; Tomio Nakamura, Ichikawa; Kiyoshi Moriya, Kanagawa; Yoshimi Nakamura, Kawasaki, and Hiroshi Utsumi, Yokohama, all of Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1975, Ser. No. 548,839
Claims priority, application Japan, Feb. 9, 1974, 49-15885
Int. Cl.² C07C 120/14
U.S. Cl. 260—465.3 10 Claims

1. A process for preparing acrylonitrile from propylene, which comprises contacting a mixture of propylene, molecular oxygen and ammonia in the vapor phase at a temperature of about 380° to about 500° C and a pressure of about atmospheric pressure to about 3 Kg/cm² G with a catalyst composition comprising active components of the following empirical formula

$$Fe_aSb_bMe_cTe_dQ_eR_fO_g$$

wherein

Me is at least one element selected from the group consisting of V, Mo and W; Q is at least one element selected from the group consisting of Cu, Mg, Zn, La, Ce, Al, Cr, Mn, Co, Ni, Bi and Sn; and R is at least one element selected from the group consisting of P and B; *a*, *b*, *c*, *d*, *e*, *f* and *g* each represents atomic ratios, and when a is 10, *b* is 15 to 60, *c* is 1 to 10, *d* is 0.5 to 10, *e* is 0.1 to 10, *f* is 0 to 5, and *g* represents the number of oxygen atoms corresponding to the oxides resulting from the combination of the above active components,

wherein the Me and Te components are substantially dissolved in the iron-antimony oxide compound having the formula $FeSbO_4$ to form a solid solution when a slurry containing said components described above, the slurry being obtained by intimately mixing the Me and Te components with the Fe and Sb components along with the Q components and R components, if present, is dried and finally calcined at a temperature of about 500° C to about 900° C.

3,988,360

PROCESS FOR PREPARING IMINODIACETONITRILE

Roger Robert Gaudette; James Edward Philbrook, both of Nashua, and Jon Carl Thunberg, Amherst, all of N.H., assignors to W. R. Grace & Co., Columbia, Md.

Continuation-in-part of Ser. No. 416,026, Nov. 15, 1973, Pat. No. 3,904,668. This application Sept. 8, 1975, Ser. No. 611,369
The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.
Int. Cl.² C07C 120/00
U.S. Cl. 260—465.5 A 9 Claims

1. A continuous process for preparing iminodiacetonitrile comprising:

a. continuously preparing an aqueous reaction mixture of hexamethylenetetramine, formaldehyde, and HCN having a mole ratio of hexamethylenetetramine to formaldehyde to HCN of 1:1–2.2:6.9–8.6 in a continuous reaction zone by continuously feeding an aqueous hexamethylenetetramine solution having a temperature of 0°–80° C, an aqueous formaldehyde solution having a temperature of 0–80° C, and HCN having a temperature of 0°–25° C, into the continuous reaction zone, the pH of the aqueous reaction mixture being 5–10;

b. continuously preparing an aqueous system containing the iminodiacetonitrile by continuously passing the aqueous reaction mixture through the continuous reaction zone while maintaining the temperature within the continuous reaction zone at 50°–250° C, residence time in the continuous reaction zone being 0.05–20 minutes; and

c. continuously recovering the iminodiacetonitrile exit the continuous reaction zone.

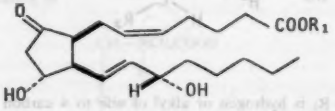
3,988,361

8β-PGE₂ AND RELATED COMPOUNDS

William P. Schneider, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

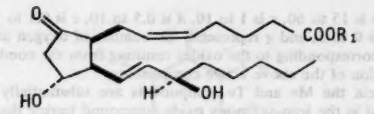
Continuation-in-part of Ser. No. 199,317, Nov. 16, 1971, abandoned, which is a continuation-in-part of Ser. No. 807,405, March 14, 1969, abandoned. This application Nov. 27, 1974, Ser. No. 527,749
Int. Cl.² C07C 177/00
U.S. Cl. 260—468 D 9 Claims

1. A racemic compound of the formula:



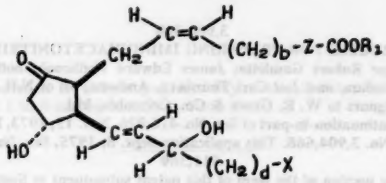
wherein R_1 is hydrogen, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation.

2. A racemic compound of the formula:



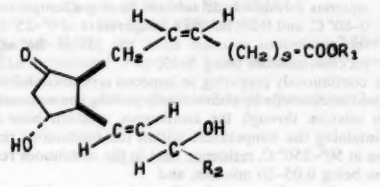
wherein R_1 is hydrogen, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation.

3. A racemic compound of the formula:



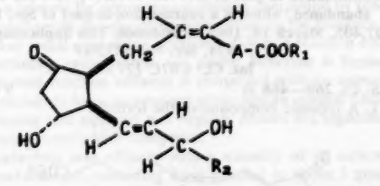
wherein R_1 is hydrogen, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation, wherein *b* is zero, one, 2, or 3, wherein *d* is zero, one, 2, 3, or 4, wherein X is isobutyl, tert-butyl, 3,3-difluorobutyl, 4,4-difluorobutyl, or 4,4,4-trifluorobutyl, and wherein Z is ethylene substituted by one or 2 fluoro, methyl, or ethyl, or by one alkyl of 3 or 4 carbon atoms.

6. A racemic compound of the formula:



wherein R_1 is hydrogen or alkyl of one to 4 carbon atoms, inclusive: and wherein R_2 is $-(CH_2)_a-CH_3$ wherein *a* is 2, 3, 4, 5, or 6; and pharmacologically acceptable salts thereof when R_1 is hydrogen.

7. A racemic compound of the formula:



wherein R_1 is hydrogen or alkyl of one to 4 carbon atoms, inclusive: wherein R_2 is $-(CH_2)_a-CH_3$ wherein *a* is 2, 3, 4, 5, or 6; and wherein A is $-CH_2-Z-$ wherein Z is ethylene substituted by one or 2 fluoro, methyl, or ethyl, or by one alkyl of 3 or 4 carbon atoms; and pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,988,362

INTERMEDIATES FOR PREPARATION OF 2,2,3-ENDOTRIMETHYL-7-ANTI-AMINO-NORBORNANES

Karl Bernauer, Allschwil; Janos Borgulya; Marc Montavon, both of Basel, all of Switzerland; Hermann Bretschneider; Kraft Hohenlohe-Oehringen, both of Innsbruck, both of Austria, and Gunter Weis, Igls, Austria, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

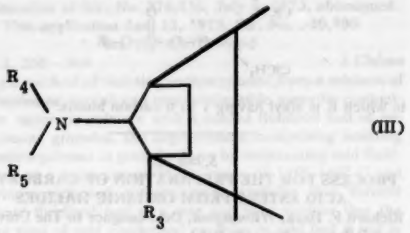
Division of Ser. No. 383,953, July 30, 1973, Pat. No. 3,884,976. This application Feb. 28, 1975, Ser. No. 553,941

Claims priority, application Switzerland, Aug. 10, 1972, 11844/72

Int. Cl.[2] C07C *101/00*, *103/37*, *143/72*

U.S. Cl. 260—471 C **5 Claims**

1. A compound of the formula



(III)

wherein R_3 is hydrogen atom or methyl, R_4 is hydrogen or a protecting group cleavable by solvolysis or reduction and R_5 is a protecting group cleavable by solvolysis or reduction and the optically active enantiomers and acid addition salts thereof wherein said protecting groups cleavable by solvolysis and reduction are selected from the group consisting of benzyl, carboalkoxy, carbobenzoxy, and formyl.

2. 2,2,3-Endo-trimethyl-7-anti-(p-toluene-sulphonylamide)-norbornane.

3,988,363

2,4,6-TRIALKYL L-3-HYDROXYPHENYLALKANOATES

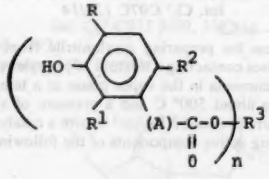
John D. Spivack, Spring Valley, and Martin Dexter, Briarcliff Manor, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 400,603, Sept. 25, 1973, abandoned. This application Aug. 2, 1974, Ser. No. 494,156

Int. Cl.[2] C07C *69/76*

U.S. Cl. 260—473 S **22 Claims**

1. A compound having the formula



wherein

R is a branched alkyl of 3 to 8 carbon atoms,

R^1 and R^2 are alkyl of 1 to 3 carbon atoms,

R^3 is alkyl of 1 to 18 carbon atoms; 2-(alkylthio)ethyl of 5 to 21 atoms in the chain; alkylene of 2 to 6 carbon atoms; 3,6-dioxa-1,8-octamethylene; or a polyvalent saturated aliphatic hydrocarbon radical of 3 to 7 carbon atoms where *n* is 3 or 4,

A is a straight chain alkylene of 1 to 3 carbon atoms, and *n* is an integer of 1 to 4.

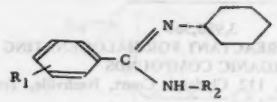
3,988,364

NOVEL N,N-DI-SUBSTITUTED AMIDINES AND SEVERAL ACID-ADDITION SALTS THEREOF

Kiyoshi Kuroda, Shizuoka; Masyuki Hori, Shizuoka; Sadami Kobari, Mishima, and Takeshi Shimizu, Shizuoka, all of Japan, assignors to Toyo Jozo Kabushiki Kaisha, Japan

Continuation of Ser. No. 422,136, Dec. 6, 1973, abandoned. This application June 19, 1975, Ser. No. 588,184
Claims priority, application Japan, Dec. 6, 1972, 47-122773; Dec. 6, 1972, 47-122774
Int. Cl.² C07C *123/00*
U.S. Cl. 260—501.14 40 Claims

1. N,N′-di-substituted amidine having the following general formula:



(I)

wherein

R_1 stands for a member selected from the group consisting of hydrogen, methyl and methoxy;

R_2 stands for a member selected from the group consisting of phenyl; tolyl, xylyl, ethylphenyl, o- and m-methoxyphenyl; and trimethylphenyl.

3,988,365

RESOLUTION OF 2-(6-METHOXY-2-NAPTHYL)PROPIONIC ACID

Pasquale Gallegra, San Jose, Calif., assignor to Syntex Corporation, Panama, Panama

Continuation-in-part of Ser. No. 350,193, April 11, 1973, abandoned, which is a continuation-in-part of Ser. No. 246,461, April 12, 1972, abandoned. This application Jan. 13, 1975, Ser. No. 540,376
Int. Cl.² C07B *21/00, 19/00;* C07C *51/42*
U.S. Cl. 260—520 D 18 Claims

1. A process for resolving 2-(6-methoxy-2-naphthyl)propionic acid comprising the steps of:

a. preparing a mixture of cinchonidine, an inorganic base selected from the group consisting of alkali metal hydroxides and alkali metal carbonates, said inorganic base having a basicity, pKa, of greater than 8, d and l 2-(6-methoxy-2-naphthyl)propionic acid and an inert organic solvent in which the cinchonidine salt of l 2-(6-methoxy-2-naphthyl)propionic acid and the inorganic base salts of d and l 2-(6-methoxy-2-naphthyl)propionic acid are soluble, the cinchonidine salt of l 2-(6-methoxy-2-naphthyl)-propionic acid being more soluble in said organic solvent than is the cinchonidine salt of d 2-(6-methoxy-2-naphthyl)propionic acid, the inorganic base salts of d and l 2-(6-methoxy-2-naphthyl)propionic acid being more soluble in said inert organic solvent than are the cinchonidine salts of d and l 2-(6-methoxy-2-naphthyl)propionic acid,

b. crystallizing the cinchonidine salts of d and l 2-(6-methoxy-2-naphthyl)propionic acid from the mixture to yield a salt product enriched in the cinchonidine salt of d 2-(6-methoxy-2-naphthyl)propionic acid, and

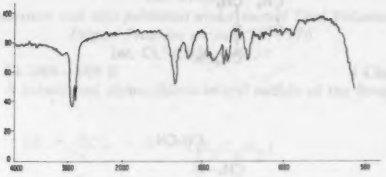
c. treating said salt product enriched in the cinchonidine salt of d 2-(6-methoxy-2-naphthyl)propionic acid with a strong base at about room temperature in methanol, mixing the resultant mixture with water, removing precipitated cinchonidine, and acidifying the resultant water-methanol mixture to yield a product enriched in d 2-(6-methoxy-2-naphthyl)propionic acid.

3,988,366

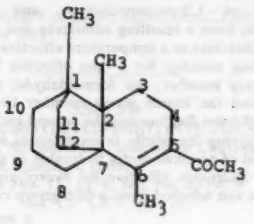
5-ACETYL-1,2,6-TRIMETHYLTRICYCLO[5,3,2,0^{2,7}]DODECA-5-ENE PERFUME COMPOSITION

Akira Nagakura, Kawaguchi; Susumu Akutagawa, Yohohama, and Haruki Kurihara, Tokyo, all of Japan, assignors to Takasago Perfumery Co., Ltd., Tokyo, Japan

Division of Ser. No. 537,002, Dec. 27, 1974. This application Oct. 14, 1975, Ser. No. 622,354
Claims priority, application Japan, Apr. 1, 1974, 49-36747
Int. Cl.² C11B *9/00*
U.S. Cl. 252—522 1 Claim



1. A perfume composition containing 5-acetyl-1,2,6-trimethyltricyclo[5,3,2,0^{2,7}]dodeca-5-ene having the formula (I)



(I)

and other perfumery ingredients.

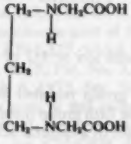
3,988,367

PREPARATION OF N,N′-DICARBOXYMETHYL-1,3-PROPANEDIAMINES

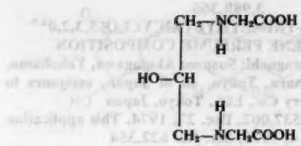
Roger Robert Gaudette, Nashua, N.H.; John Leonard Ohlson, Bedford, and Patricia Marie Scanlon, Arlington, both of Mass., assignors to W. R. Grace & Co., New York, N.Y.

Filed Nov. 11, 1975, Ser. No. 630,791
Int. Cl.² C07C *101/02*
U.S. Cl. 260—534 E 15 Claims

1. A process for forming an acid selected from a first group consisting of

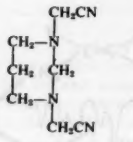


and

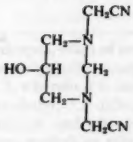


comprising:

a. forming a nitrile selected from a second group consisting of

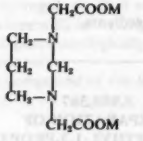


and

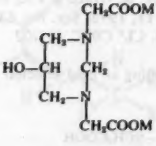


by admixing, in an aqueous medium formaldehyde; (i) a member selected from a third group consisting of HCN and glycolonitrile; and (ii) a member selected from a fourth group consisting of 1,3-propanediamine and 1,3-diamino-2-propanol, to form a resulting admixture and maintaining the resulting admixture at a temperature effective for forming the second group member for a time effective for forming the second group member, the formaldehyde, the third group member, and the fourth group member being admixed in amounts effective for forming the second group member;

b. hydrolyzing the nitrile in an aqueous medium with an amount of an alkali metal hydroxide or an alkaline earth metal hydroxide effective for hydrolyzing the nitrile to form a salt selected from a fifth group consisting of



and



in which M is an alkai metal ion or 1/2 of an alkaline earth metal ion; and

c. converting the fifth group member to the first group member by treating the fifth group member in an aqueous medium with an amount of a mineral acid or an acidic ion exchange resin effective for forming the first group member.

3,988,368

PROCESS FOR PRODUCING PHENYLPHOSPHONOTHIOIC DICHLORIDE

Yasukazu Ura, and Hideki Takamatsu, both of Funabashi, Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed June 12, 1975, Ser. No. 586,392

Claims priority, application Japan, June 22, 1974, 49-71616

Int. Cl.² C07F *9/42*

U.S. Cl. 260—543 P **9 Claims**

1. In a process for producing phenylphosphonothioic dichloride by reacting benzene with thiophosphoryl trichloride, the improvement characterized in that the reaction is conducted in the presence of a catalyst selected from the group consisting of Al, $AlCl_3$, a combination of $AlCl_3$, P_2S_5 and PCl_3, a combination of $AlCl_3$ and P_2S_5, and a combination of $AlCl_3$ and PCl_3, under the self-generated pressure of hydrogen chloride gas at a temperature of 100°–300° C.

3,988,369

PROCESS AND REACTANT FOR HALOGENATING ORGANIC COMPOUNDS

Donald E. Pearson, 112 Clydelan Court, Nashville, Tenn. 37205

Filed Sept. 26, 1974, Ser. No. 509,511

Int. Cl.² C07B *9/00*; C07C *17/00*

U.S. Cl. 260—544 R **9 Claims**

3. A process for halogenating organic compounds comprising contacting said organic compounds with a trialkyl phosphate wherein the alkyl radical has 4 or less carbon atoms and a halogen selected from the group consisting of chlorine, bromine and iodine, wherein the mole ratio of trialkyl phosphate to halogen is from about 1:1 to about 1:100 and the halogenation is carried out at a temperature of from about 0° to about 150° C.

3,988,370

AMIDINOUREAS

Royal A. Cutler, Sand Lake, and Samuel Schalit, Albany, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 79,266, Oct. 8, 1970, Pat. No. 3,798,269, which is a division of Ser. No. 749,986, Aug. 5, 1968, Pat. No. 3,652,766, which is a continuation-in-part of Ser. No. 556,897, June 13, 1966, abandoned, which is a continuation-in-part of Ser. No. 462,077, June 7, 1965, abandoned. This application Aug. 24, 1973, Ser. No. 391,473

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² C07C *127/15*

U.S. Cl. 260—553 R **3 Claims**

1. 1-Amidino-3-decylurea.
2. 1-Amidino-3-undecylurea.
3. 1-Amidino-3-dodecylurea.

3,988,371

META-[2-(BENZYLAMINO)-ETHYL] BENZOIC ACID AMIDES

Nikolaus R. Hansl, 7815 Pine St., Omaha, Nebr. 68124

Continuation-in-part of Ser. No. 233,339, March 9, 1972, abandoned, which is a continuation-in-part of Ser. No. 85,283, Oct. 29, 1970, Pat. No. 3,792,048, and a continuation-in-part of Ser. No. 745,352, July 17, 1968, abandoned. This application July 30, 1974, Ser. No. 493,160

Int. Cl.² C07C *103/28*

U.S. Cl. 260—558 A **1 Claim**

1. A compound selected from the group consisting of m-[2-(benzylamino)-ethyl] benzamide, m-[2-(benzylamino)-ethyl] benzoic acid methyl amide, m-[2-(benzylamino)-ethyl] benzoic acid benzyl amide, m-[2-(benzylamino)-ethyl] benzoic acid diethyl amide, and m-[2-(benzylamino)-ethyl] benzoic acid cyclohexamide, or the optical antipode or the pharmaceutically-acceptable acid addition salt thereof.

3,988,372

ENAMINE INTERMEDIATES FOR PRODUCING PROSTAGLANDINS

George E. Just, Westmount, Canada, and Chaim Simonovitch, Rishon-Le-Zion, Israel, assignors to George E. Just, Westmount, Canada

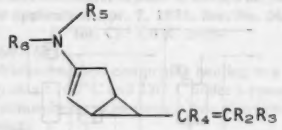
Division of Ser. No. 281,341, Aug. 17, 1972, Pat. No. 3,920,643, which is a continuation of Ser. No. 103,334, Dec. 31, 1970, abandoned, which is a continuation-in-part of Ser. No. 657,085, July 31, 1967, abandoned. This application July 21, 1975, Ser. No. 597,457

Claims priority, application United Kingdom, Aug. 9, 1966, 35550/66; July 5, 1967, 3588/67

Int. Cl.² C07C *87/02, 175/00*

U.S. Cl. 260—563 R 4 Claims

1. A compound of the formula



wherein R_2 is alkyl of 4 to 8 carbon atoms, inclusive, wherein R_3 and R_4 are hydrogen or methyl, and wherein R_5 and R_6 are alkyl of one to 8 carbon atoms, inclusive.

3,988,373

QUATERNARY AMMONIUM SALTS

Kazuo Nakanishi, Osaka; Takashi Iwata, Kyoto; Hisae Haruta, Ibaraki; Kazuhiko Yoshida; Hideo Yagi, both of Osaka, and Akira Hashimoto nee Matui, Suita, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

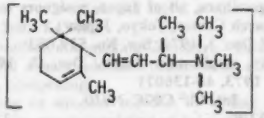
Continuation-in-part of Ser. No. 127,010, March 22, 1971, Pat. No. 3,850,611. This application Sept. 16, 1974, Ser. No. 506,001

Claims priority, application Japan, Mar. 28, 1970, 45-26097; Mar. 28, 1970, 45-26098; Mar. 25, 1970, 45-25544; June 2, 1970, 45-48343; Apr. 6, 1970, 45-29540

Int. Cl.² C07C *87/46*

U.S. Cl. 260—567.6 M 1 Claim

1. A quaternary ammonium salt of the formula



3,988,374

POLYAMIDE-IMIDES

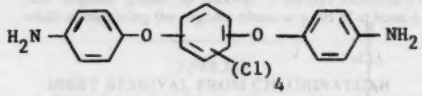
George L. Brode, and James H. Kawakami, both of Piscataway, N.J., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 50,968, June 29, 1970, abandoned. This application Sept. 21, 1971, Ser. No. 182,526

Int. Cl.² C07C *91/16*

U.S. Cl. 260—571 1 Claim

1. An amine having the formula:



3,988,375

PHENYL SULFONYL, BENZYLTHIOCHLOROMETHANES

Wendell Gary Phillips, Olivette, Mo., assignor to Monsanto Company, St. Louis, Mo.

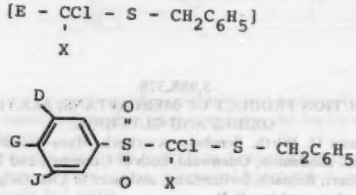
Division of Ser. No. 399,664, Sept. 21, 1973, Pat. No. 3,839,403, which is a division of Ser. No. 139,978, May 3, 1971, Pat. No. 3,792,088. This application May 30, 1974, Ser. No. 474,573

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 20, 1976

Int. Cl.² C07C *149/34*

U.S. Cl. 260—609 E 4 Claims

1. A substituted alpha-chloro-benzyl sulfide of the formula



wherein X is hydrogen or chloro and D, G and J are hydrogen, bromo, chloro or alkyl.

3,988,376

VINYL 2-SUBSTITUTED-THIOVINYL SULFONES

Philip S. Magee, Novato, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Feb. 12, 1976, Ser. No. 657,679

Int. Cl.² C07C *149/10*

U.S. Cl. 260—609 E 6 Claims

1. A compound of the formula

wherein R is alkyl of 1 to 6 carbon atoms, phenyl or phenyl substituted with 1 to 3 of the same or different substituents selected from fluoro, chloro, bromo, nitro or alkyl of 1 to 4 carbon atoms.

3,988,377

HYDROXY SUBSTITUTED SULFOXIDES AND THIOTHERS

Vincent Lamberti, Upper Saddle River, N.J., and Henry Lemaire, Fairfield, Conn., assignors to Lever Brothers Company, New York, N.Y.

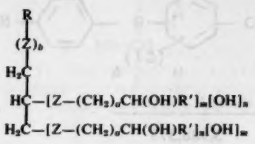
Division of Ser. No. 113,079, Feb. 5, 1971, Pat. No. 3,758,595, which is a continuation-in-part of Ser. No. 764,362, Aug. 7, 1968, Pat. No. 3,562,337, which is a division of Ser. No. 502,299, Oct. 22, 1965, Pat. No. 3,427,248. This application July 6, 1973, Ser. No. 376,946

The portion of the term of this patent subsequent to Sept. 11, 1990, has been disclaimed.

Int. Cl.² C07C *149/16*

U.S. Cl. 260—609 R 13 Claims

1. A detergent having the structure:



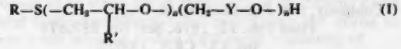
wherein R is an aliphatic hydrocarbon group having 5–15 carbon atoms; Z is oxygen, sulfur or sulfoxide but at least one Z is sulfur or sulfoxide; *a* is 1 or 2; *b* is 0 or 1; *m* is 0 or 1; *n* is 0 or 1; *m*+*n* in all occurrences is 1; and R′ is H, CH_2OH or CH_3.

3,988,378
REACTION PRODUCT OF MERCAPTANS, ALKYLENE OXIDES AND GLYCIDOL

Hermann O. Wirth, Bensheim-Averbach; Hans-Helmut Friedrich, Lindenfels, Odenwald, both of Germany, and Helmut Linhart, Reinach, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

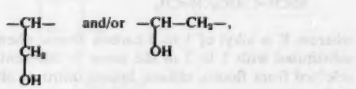
Division of Ser. No. 539,139, Jan. 7, 1975, Pat. No. 3,936,422.
This application July 31, 1975, Ser. No. 600,654
Claims priority, application Switzerland, Jan. 10, 1974, 286/74
Int. Cl.² C07C *149/14*, *149/32*
U.S. Cl. 260—609 R **10 Claims**

1. A compound of the formula I

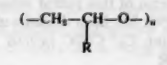


(I)

wherein R′ denotes a hydrogen atom and/or the methyl group, Y denotes



a denotes, as an average value, a number between 1.0 and 12, *n* denotes, as an average value, a number from 0.5 to 8, R denotes a linear or branched alkyl radical having 8 to 24 carbon atoms, which can be interrupted once by the groups, —O— or —S—, or denotes phenyl, phenyl substituted by linear or branched alkyl groups, or phenylalkylene having 1 to 3 carbon atoms in the alkylene chain, the alkylene chain or the linkage thereof to the phenyl group optionally interrupted by an oxygen or sulphur atom, and for the phenyl radical thereof optionally substituted by linear or branched alkyl groups, and in all cases the phenylalkylene radical contains 7 to 30 carbon atoms, and in the case where R′ is the methyl group, R also denotes a linear or branched alkyl group having 1 to 7 carbon atoms, the sum of the carbon atoms of R and of the radical

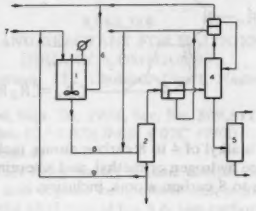


in formula I being 8 to 40.

3,988,379
MANUFACTURE OF CYCLOHEXANOL FROM CYCLOHEXENE

Rolf Platz, Mannheim; Werner Fuchs, and Christian Dudeck, both of Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 252,831, May 12, 1972, abandoned.
This application July 5, 1974, Ser. No. 486,058
Claims priority, application Germany, May 18, 1971, 2124590
Int. Cl.² C07C *29/06*
U.S. Cl. 260—631 R **3 Claims**



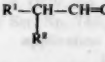
1. In a method for the continuous production of cyclohexanol from cyclohexene in two stages involving the addition of sulfuric acid and hydration, the improvement which comprises mixing sufficient sulfuric acid with said cyclohexene to provide a sulfuric acid concentration in the first stage of from 50 to 70% by weight in the presence of iron(II) sulfate while the temperature of the reaction solution is kept at from 50° to 100° C.

3,988,380
PROCESS FOR PREPARING 1,2-DISUBSTITUTED-TRANS-OLEFINS

Kiyosi Kondo; Akira Negishi, both of Yamato, and Daiei Tunemoto, Sagamihara, all of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

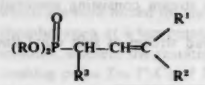
Filed Dec. 3, 1974, Ser. No. 529,083
Claims priority, application Japan, Dec. 7, 1973, 48-136070; Dec. 7, 1973, 48-136071
Int. Cl.² C07C *29/10*
U.S. Cl. 260—632 R **11 Claims**

1. A process for preparing 1,2-disubstituted-trans-olefins of the following formula



(I)

wherein R^1 and R^2, independently of each other, represent a hydrogen atom or an alkyl of 1 to 20 carbon atoms or alkenyl of 2 to 20 carbon atoms with the proviso that R^1 and R^2 do not represent hydrogen atoms at the same time, and R^3 represents a hydroxyl substituted alkyl of 1 to 15 carbon atoms, or hydroxyl substituted alkenyl of 2 to 15 carbon atoms, wherein the hydroxyl substituent may be protected with a tetrahydropyranyloxy moiety, which comprises reacting a 2-alkenyl phosphonic acid derivative of the following formula



(II)

wherein R is an alkyl containing 1 to 4 carbon atoms, and R^1, R^2 and R^3 are the same as defined above, with a metal hydride containing an Al-H bond selected from the group consisting of lithium aluminum hydride, iso-butyl hydride, sodium bis (2-methoxyethoxy) aluminum hydride, and aluminum hydride.

3,988,381

HYDRATION METHOD AND CATALYST

Lothar G. Dulog, St. Martens-Latem, Belgium, assignor to S.A. Texaco Belgium N.V., Brussels, Belgium

Division of Ser. No. 368,136, June 8, 1973, Pat. No. 3,943,074. This application Apr. 7, 1975, Ser. No. 565,981

Int. Cl.² C07C *29/04*

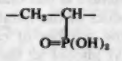
U.S. Cl. 260—641 **2 Claims**

1. A hydration method comprising heating at a temperature of between about 100° C and 220° C under a pressure of about 50 to 200 atmospheres in an oxygen free atmosphere an olefin of the formula:

$CH_2 = CH—R$

wherein R is lower alkyl with a molar excess basis olefin of water in the presence of a vinylphosphonic acid polymer catalyst of the formula:

AxBy wherein the ratio (x/y) ranges from about 0.5 to 1.5, wherein A is



and B is $-CH_2-CH-SO_2-CH-CH_2-$

and A is attached to two other units both of which are A and/or B and B is attached to four other units all of which are A and/or B, and recovering the alcohol corresponding to said olefin.

3,988,382

SYNTHESIS OF 2-METHYL-3-BUTEN-2-OL

Pius Anton Wehrli, North Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 151,557, June 9, 1971, Pat. No. 3,838,183. This application June 19, 1974, Ser. No. 480,662

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² C07C *29/24*

U.S. Cl. 260—643 R **5 Claims**

1. A method for making 2-methyl-3-buten-2-ol from the 2-halo and 4-halo addition products of a hydrohalide and isoprene, comprising:

providing an aqueous solution by adding a base, selected from the group consisting of calcium hydroxide, calcium carbonate, sodium bicarbonate, sodium carbonate and ammonium hydroxide; and water to said addition products, said base being added in an amount of from about 5% to about 35% by weight in excess of the amount required to hydrolyze said addition products such that a pH of at least 4 is provided; distilling said solution while maintaining said solution at a pH of at least 4 to produce an azeotropic water-immiscible 2-methyl-3-buten-2-ol mixture as the distillate; adding an alkali metal halide and an inert water-immiscible organic solvent to said distillate to form a two phase system containing an organic phase and an aqueous phase wherein the alkali metal halide is added to provide at least 50% of the amount necessary to saturate said aqueous phase, separating said aqueous phase from said organic phase and fractionally distilling said organic phase to recover 2-methyl-3-butene-2-ol while maintaining the organic phase at a pH of at least 4.

3,988,383

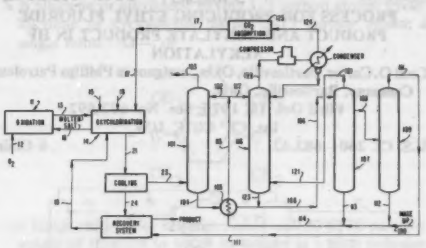
INERT REMOVAL FROM CHLORINATED HYDROCARBON PRODUCTION SYSTEM

Chiung-Yuan Huang, Glen Ridge, and Stephen J. Sopko, Clark, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Jan. 31, 1975, Ser. No. 545,794

Int. Cl.² C07C *19/00*

U.S. Cl. 260—652 P **13 Claims**



1. In a process for producing chlorinated hydrocarbons in a chlorinated hydrocarbon production zone, the improvement comprising:

recovering a gas stream comprising unreacted hydrocarbon, at least one low boiling chlorinated hydrocarbon, carbon dioxide and inerts;

introducing said gas stream into a first absorption zone wherein said gas stream is contacted with a chlorinated hydrocarbon absorption oil having a number of carbon atoms corresponding to the unreacted hydrocarbon and a boiling point of at least 140° F to absorb unreacted hydrocarbon, carbon dioxide and the at least one low boiling chlorinated hydrocarbon from the gas stream;

withdrawing a rich absorption solution from the first absorption zone and introducing the rich absorption solution into a stripping zone to recover a first stream containing lean absorption solution, a second stream containing unreacted hydrocarbon, carbon dioxide and a minor portion of the at least one low boiling chlorinated hydrocarbon and a third stream containing the at least one low boiling chlorinated hydrocarbon;

introducing the second stream into a second absorption zone wherein the second stream is contacted with the chlorinated hydrocarbon absorption oil under conditions such that the at least one low boiling chlorinated hydrocarbon is selectively absorbed; and

recovering from the second absorption zone unreacted hydrocarbon and carbon dioxide essentially free of the at least one low boiling chlorinated hydrocarbon.

3,988,384

CONVERSION OF OLEFINS USING IMPROVED CATALYSTS

Martin Cherubim, Rheinkamp-Eick; Elmar Wilms, Kamp-Lintfort, and Hans Arendsen, Homberg, all of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Filed Dec. 3, 1974, Ser. No. 529,182

Claims priority, application Germany, Dec. 7, 1973, 2360981

Int. Cl.² C07C *3/62*

U.S. Cl. 260—683 D **10 Claims**

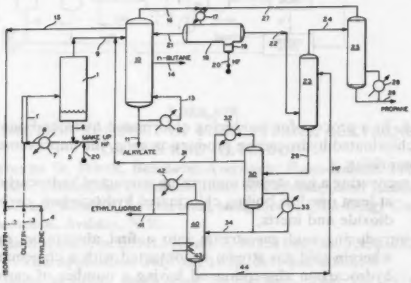
1. In a process for the disproportionation of olefins which comprises contacting an olefin at a temperature between about 100° and 300° C. with a disproportionation catalyst, the

improvement which comprises contacting said olefin with a disproportionation catalyst prepared by a method which comprises impregnating a refractory inorganic oxide support with a compound of at least one catalytically active metal, calcining the impregnated support at a temperature between 300° and 800° C., impregnating the calcined catalyst with an alcoholic solution of a member of the group consisting of alkali metal salts, alkali metal bases and alkali metal alcoholates and recalcining the catalyst at a temperature between 400° and 700° C.

3,988,385
PROCESS FOR PRODUCING ETHYL FLUORIDE PRODUCT AND ALKYLATE PRODUCT IN HF ALKYLATION

Cecil O. Carter, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 15, 1975, Ser. No. 622,592
Int. Cl.² C07C *3/54*
U.S. Cl. 260—683.42 **6 Claims**



1. A process for producing ethyl fluoride product and an alkylate product comprising

a. introducing a stream of isoparaffin selected from the group consisting of isobutane, isopentane and mixtures thereof, a stream of an olefin selected from the group consisting of propylene, butylenes, and mixtures thereof, and a stream of ethylene into an alkylation reaction zone,

b. reacting said paraffin and said olefin in said alkylation reaction zone in the presence of a catalyst comprising HF to form a reaction product stream comprising an alkylate, isoparaffin, HF, ethyl fluoride and propane,

c. passing said reaction product stream into a separation zone,

d. removing a stream of said alkylate product from said reaction product stream in said separation zone,

e. removing a stream of isoparaffin from said reaction product stream in said separation zone,

f. removing a stream consisting essentially of HF, ethyl fluoride, propane and isoparaffin from said separation zone,

g. extracting ethyl fluoride from said stream of step (*f*) with liquid HF and passing said extracted stream consisting essentially of HF, ethyl fluoride and isoparaffin into a first column,

h. fractionally distilling said extracted stream consisting essentially of HF, ethyl fluoride and isoparaffin in said first column under a pressure in the range of about 150 to 300 psig to form an overhead stream consisting essentially of said isoparaffin and a bottoms stream consisting essentially of HF and ethyl fluoride,

i. passing said bottoms stream consisting essentially of HF and ethyl fluoride into a second column,

j. fractionally distilling said bottoms stream consisting essentially of HF and ethyl fluoride in said second column under a pressure in the range of about 50 to 145 psig to form an overhead stream consisting essentially of ethyl fluoride and a bottoms stream consisting essentially of HF, and

k. recovering said overhead stream as said ethyl fluoride product of the process.

3,988,386
SYNTHETIC RESINS

Wolfgang Hesse, and Gisbert Moller, both of Weisbaden, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed July 16, 1973, Ser. No. 379,494
Claims priority, application Germany, July 17, 1972, 2235051
Int. Cl.² C08G *8/08*; C08L *63/00*
U.S. Cl. 260—831 **13 Claims**

1. A process for the preparation of novolaks which comprises reacting in at least one stage at temperatures up to 260° C a) at least one unsubstituted phenol, b) at least one condensation product of formaldehyde and at least one alkyl phenol containing at least 3 carbon atoms in the alkyl substituent, the said condensation product containing at least one member selected from the group consisting of methylol groups and methylene ether linkages and having been prepared in the presence of 0.025 to 1 mole of an alkali at temperatures of from room temperature to 70° C in a molar ratio of formaldehyde to alkyl phenol of from 1-2 : 1 and being substantially freed from unreacted basic materials and c) less than one mole of formaldehyde per mole of phenol calculated on the basis of the total number of moles of unsubstituted phenol and alkyl phenol present and including the formaldehyde already present in the alkyl phenol-formaldehyde condensation product, in the presence of an acid catalyst wherein the quantity of free formaldehyde in the reaction mixture is less than 1 % by weight and that the ratio of the product of the number of moles of alkyl phenol multiplied by the number of carbon atoms in the alkyl radicals of the alkyl phenol to the total molar number of phenolic hydroxy groups in the starting materials is in the range from 0.6 to 1.25 : 1.

3,988,387
POLYESTER FIBERS HAVING EXCELLENT DYEABILITY

Kazuya Chimura; Hiroshi Iwata, both of Ohtake; Takashi Kaneko, Tokyo, and Ryuichi Nakazono, Ohtake, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 449,338, March 8, 1974, abandoned. This application Oct. 11, 1974, Ser. No. 514,132
Int. Cl.² C08L *67/02*
U.S. Cl. 260—860 **5 Claims**

1. Polyester fibers having an initial Young's modulus of at least 70 g/d and containing at least one sulfonate component which are characterized by excellent dyeability, which comprise: 60 to 95% by weight of a polyester containing at least 95 mol % of ethylene terephthalate units which contains not more than 3 mol % of a sulfonate compound of the formula

wherein R is selected from the group consisting of hydrogen, lower alkyl and hydroxyloweralkyl, M is an alkali metal, m is 1 or 2 and n is 1, 2 or 3, and which has an intrinsic viscosity [η] PET of 0.9 ≧ [η] PET ≧ 0.5 and 40 to 5% by weight of a polyester containing at least 85 mol % of tetramethylene terephthalate units which contains not more than 10 mol % of said sulfonate compound and which has an intrinsic viscosity [η] PTMT of 1.5 ≧ [η] PTMT ≧ 0.7 and these two viscosities have the relation of [η] PTMT ≧ [η] PET +

0.1, which are melt mixed to cause an ester interchange reaction therebetween at a temperature of 265°–300° C for 3 to 120 minutes, wherein the resulting polyester is characterized by a melting point Tm (° C) of Tm_o–5(° C) ≧ Tm ≧ Tm_o –20 (° C), wherein Tm_o means the melting point of a polyester containing at least 95 mol % of ethylene terephthalate, a crystallizing temperature of at least 170° C, and a sulfonate compound content of at least 1.8% per mol of the terephthalate component of the polyester.

3,988,388

POLYMERIZABLE ORGANIC DISPERSION OF UNSATURATED POLYESTER VINYL MONOMER AND EVA COPOLYMERS

Heinrich Alberts, Cologne; Hansjochen Schulz-Walz, Meerbusch; Herbert Bartl, Odenthal-Hahnenberg; Leonhard Goerden, Grefrath-II-Oedt, and Klaus Schuster, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 25, 1975, Ser. No. 552,860

Claims priority, application Germany, Mar. 2, 1974, 2410083; Oct. 17, 1974, 2449397

Int. Cl.² C08L *67/06*

U.S. Cl. 260—862 **3 Claims**

1. A pourable and pumpable, storage-stable dispersion which can be cured with minimal shrinkage comprising 35–59% by weight of an unsaturated polyester, 40–64% by weight of a copolymerizable vinyl monomer, 1–20% by weight of a low shrinkage thermoplastic copolymer selected from the group consisting of ethylene/vinyl acetate copolymer, ethylene/vinyl propionate copolymer and mixtures thereof, each said copolymer containing 0.5–20% by weight of vinyl ester and said copolymer having up to 50% by weight thereof replaced by polyethylene, and 0.001–20% by weight of a dispersing agent which is an ethylene/vinyl acetate copolymer containing 60–99% by weight of vinyl acetate and having a Mooney viscosity of at least 15.

3,988,389

MOULDING COMPOSITIONS CONTAIN POLYCARBONATE AND GRAFT COPOLYMER OF A RESIN FORMING MONOMER ON A RUBBER

Dieter Margotte; Hermann Schirmer, both of Krefeld; Karl-Heinz Ott, Leverkusen; Günther Kampf, Krefeld-Bockum; Günther Peilstocker, Krefeld-Bockum, and Hugo Vernaleken, Krefeld-Bockum, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation of Ser. No. 421,487, Dec. 3, 1973, abandoned. This application Sept. 19, 1975, Ser. No. 614,913

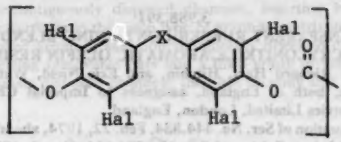
Claims priority, application Germany, Oct. 25, 1973, 2353428; Dec. 6, 1972, 2259565

Int. Cl.² C08L *55/02, 69/00*

U.S. Cl. 260—873 **4 Claims**

1. A moulding composition of:

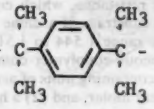
from 70 to 30 parts by weight of a thermoplastic polycarbonate which is a mixture of 50–85% by weight of a polycarbonate made from a halogen free phenol and 15–50% by weight of a halogen containing polycarbonate of the formula



wherein

n is 15–200

X is alkylene or alkylidene having 1–5 carbon atoms; cycloalkylene or cycloalkylid having 5–15 carbon atoms; a single bond;—O—; or



and Hal is chlorine or bromine; and from 30 to 70 parts by weight of from 25 to 100% by weight of a graft polymer of a rubber onto which a

grafting monomer mixture of

from 95 to 50% by weight of styrene, methyl methacrylate or a mixture thereof, and

from 50 to 5% by weight of acrylonitrile, methyl methacrylate or a mixture thereof is polymerized

wherein

a. the ratio by weight of the rubber to said grafting monomer mixture is within the range of from 85:15 to 40:60;

b. the graft copolymer in the moulding composition consists of particles having an average diameter of from 0.2 to 5.0μ; and

c. the moulding composition contains from 10 to 35% by weight of the rubber.

3,988,390

THERMOPLASTIC POLYCARBONATE MOULDING COMPOSITIONS

Richard Prinz, Leverkusen; Salah Elabd Elghani, Cologne; Winfried Fischer, Cologne, and Heinrich Alberts, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 465,688, April 30, 1974. This application Aug. 12, 1975, Ser. No. 604,009

Claims priority, application Germany, May 4, 1973, 2322435

Int. Cl.² C08L *67/06*

U.S. Cl. 260—873 **9 Claims**

1. A thermoplastic moulding composition comprising

i. from 5 to 95% by weight of at least one polycarbonate derived from a divalent phenol and

ii. from 95 to 5% by weight of at least one graft copolymer comprising

a. from 10 to 70% by weight of an ethylene/vinyl acetate copolymer containing from 25 to 75% by weight of vinyl acetate having grafted thereon

b. from 90 to 30% by weight of a copolymer prepared from a monomer mixture comprising

1. from 15 to 85 parts by weight of acrylonitrile, methacrylonitrile or a mixture thereof,

2. from 10 to 85 parts by weight of styrene, α-methylstyrene or a mixture thereof and

3. from 0.1 to 20 parts by weight of at least one monoolefin.

3,988,391

TRANSPARENT RUBBER-CONTAINING BLEND OF ACRYLONITRILE/AROMATIC OLEFIN RESIN

Charles Richard Hart, Hitchin, and Eric Nield, Watton-at-Stone, both of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 444,834, Feb. 22, 1974, abandoned, which is a division of Ser. No. 294,611, Oct. 3, 1972, abandoned. This application May 27, 1975, Ser. No. 580,826

Claims priority, application United Kingdom, Oct. 14, 1971, 47793/71; Nov. 1, 1971, 50637/71

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C08L *51/00, 53/00*

U.S. Cl. 260—876 R **6 Claims**

1. A blend suitable for making transparent molded articles having good impact resistance, which comprises (1) a graft copolymer having a substrate of a diene rubber having a refractive index in the range 1.544 to 1.519 and a superstrate which is a homogeneous copolymer comprising acrylonitrile and aromatic olefin containing units of acrylonitrile within the range 80 to 93 percent molar, and (2) a homogeneous acrylonitrile/ aromatic olefin resin containing units of acrylonitrile within the range 86 to 93 percent molar, the blend containing 1 to 50 percent by weight of rubber based on the weight of the blend, the resin having a refractive index at least 0.002 unit lower than that of a homogeneous copolymer of acrylonitrile and said aromatic olefin resin of the same acrylonitrile content as the superstrate, and the resin and the diene rubber used for the substrate having refractive indices differing from each other and from that of a homogeneous acrylonitrile/aromatic olefin resin of the same acrylonitrile content of the superstrate by not more than 0.008.

3,988,392

METHYL METHACRYLATE POLYMER COMPOSITION

Nobuo Kameda; Yoshio Nakai, and Mitsuru Takahashi, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 340,460, March 12, 1973, abandoned. This application Feb. 10, 1975, Ser. No. 548,628

Claims priority, application Japan, June 24, 1972, 47-63519

Int. Cl.² C08L *51/06, 31/02*

U.S. Cl. 260—876 R **9 Claims**

1. A polymer composition consisting essentially, by weight, of:

A. 95 to 50% of a polymer consisting essentially, by weight, of 100 to 80% methyl methacrylate and 0 to 20% of at least one copolymerizable vinyl and/or vinylidene monomer, at least 10 parts by weight of said polymer (A), based on 100 parts by weight of the crosslinked elastomer in (B) below, being those obtained by polymerization in the presence of the crosslinked elastomer in (B) below; and

B. 5 to 50% of a crosslinked elastomer obtained by copolymerizing by aqueous emulsion polymerization a monomer mixture consisting essentially of:

I. at least one alkyl acrylate containing from 2 to 8 carbon atoms in the alkyl moiety,

II. allyl acrylate and/or allyl methacrylate, and

III. benzyl acrylate, said crosslinked elastomer being substantially spherical in shape and having an average particle size of 0.05 to 0.25 micron, a degree of swelling 3 to 20 and a gel content of not less than 80%; and the amounts of the three components (I), (II) and (III) contained in the crosslinked elastomer (B) being such that component (II) is present in an amount of 0.5 to 5 parts based on 100 parts of component (I) and the ratio of component (I) + component (II) /component (III) is from 75/25 to 65/35, all by weight.

3,988,393

RIGID PLASTIC ADMIXED WITH CROSSLINKED ACRYLATE/VINYL CHLORIDE INTERPOLYMER

Ruth E. Gallagher, Dobbs Ferry, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 424,128, Dec. 12, 1973, Pat. No. 3,929,933, which is a continuation-in-part of Ser. No. 182,127, Sept. 20, 1971, abandoned, which is a continuation-in-part of Ser. No. 101,160, Dec. 23, 1970, abandoned. This application July 25, 1975, Ser. No. 599,262

Int. Cl.² C08L *51/00, 53/00*

U.S. Cl. 260—876 R **12 Claims**

1. An impact resistant composition comprising an intimate admixture of a styrene-containing rigid plastic having a modulus of elasticity of greater than 7,000 kgf/cm² at 23° C. and 50% relative humidity and rubber-containing interpolymer particles consisting essentially of a crosslinked aromatic acrylic emulsion polymer having a glass transition temperature less than about 25° C. and a vinyl chloride suspension polymer surrounding and/or homogeneously dispersed within the mass of said crosslinked acrylic emulsion polymer.

3,988,394

HYDROXYLATED AND CHLORINATED BLOCK LAMINATES AND THEIR PREPARATION

James T. Harlan, Jr., Torrance, Calif., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 417,348, Nov. 19, 1973, Pat. No. 3,904,801. This application Aug. 9, 1974, Ser. No. 495,976

Int. Cl.² C08L *9/06*

U.S. Cl. 260—880 B **3 Claims**

1. A process for the preparation of a chlorinated and hydroxylated block copolymer comprising at least two polymer blocks of at least one monoalkenyl arene and at least one chlorohydrinated polymer block of the group consisting of polymerized conjugated dienes and hydrogenated polymer blocks of conjugated dienes, chlorine and hydroxyl radicals being directly attached to carbon atoms of the polymeric chain, the weight ratio of chlorine to hydroxyl groups being between about 0.5 and 5.0, and the chlorine content being 1–15% by weight of the copolymer, said process comprising

a. contacting an aqueous solution of an alkaline earth metal hypochlorite with a hydrocarbon solution of a block copolymer having at least two monoalkenyl arene polymer blocks and at least one polymer block of the group consisting of conjugated diene polymer blocks and hydrogenated conjugated diene polymer blocks at a temperature between about 35° and 85° F for from 5 to 60 minutes, said hydrocarbon being blended with 10–15 weight percent of a miscible water soluble solvent, and

b. thereafter separating the resulting aqueous hypochlorite phase from the hydrocarbon-block copolymer phase.

3,988,395

METHOD FOR BLENDING POLYOLEFIN COMPOSITIONS

Ralph W. Myerholtz, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

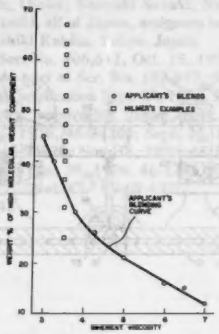
Continuation-in-part of Ser. No. 79,256, Oct. 8, 1970, abandoned. This application Sept. 22, 1975, Ser. No. 615,607

Int. Cl.² C08L *23/06*

U.S. Cl. 260—897 A **11 Claims**

1. A method for blending polyolefins with up to four polymeric components, each formed from ethylene or a mixture of ethylene and a lower mono-olefin polymerized at about 230° to 300° C. in a suitable liquid hydrocarbon medium in contact with an effective amount of molybdenum oxide catalyst supported on gamma-alumina, wherein at least a low molecular weight component having a melt index of about 3.0 to 10.0 and at least a high molecular weight component having an inherent viscosity of about 3.0 to 7.0 are blended such that the melt index of the blend is about 0.1 to 1.8 and wherein for a

given inherent viscosity of the high molecular weight component the weight percent of the high molecular weight component is the corresponding value on the Blending Curve shown in the Figure.



3,988,396
AERATION TUBING SYSTEM

Forrest B. Stannard, 1910 NE. 43rd Court, Fort Lauderdale, Fla. 33308

Continuation of Ser. No. 412,173, Nov. 2, 1973, abandoned. This application June 16, 1975, Ser. No. 587,207

Int. Cl.² B01F *3/04*

U.S. Cl. 261—124 **2 Claims**

1. An aeration dispensing device comprising:
a resilient plastic tube having a plurality of aeration slits disposed longitudinally about the circumference of said plastic tube;
a spiral-shaped wire weight wound about the outside circumferences of said resilient plastic tube; and,
an inlet source of fluid pressure connected at one end of said plastic tube, so constructed and arranged that the weight of said wire controls the buoyancy of said tube, the tension imparted by said wound wire controls the size of the slit openings when the tube is placed under pressure, and the distance between successive coils of said wire weight increases as a function of the distance of each of said coils from said inlet source of fluid pressure.

3,988,397
PRESSED BLOCK FUEL ELEMENTS FOR GAS COOLED HIGH TEMPERATURE POWER REACTORS AND PROCESSES FOR THEIR PRODUCTION

Karl-Gerhard Hackstein, Hanau, and Milan Hrovat, Rodenbach, both of Germany, assignors to Nukem G.m.b.H., Frankfurt, Germany

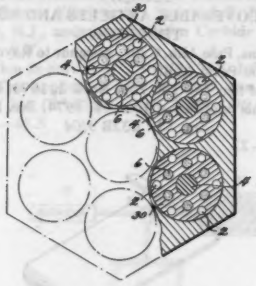
Division of Ser. No. 277,050, Aug. 1, 1972, Pat. No. 3,891,502. This application Feb. 6, 1974, Ser. No. 440,079

Claims priority, application Germany, Feb. 14, 1972, 2206843

Int. Cl.² G21C *21/02*

U.S. Cl. 264—.5 **1 Claim**

1. A process for the production of a block fuel element consisting essentially of providing a block fuel free graphite matrix material having a plurality of noncontiguously disposed channels therein, inserting fissile uranium particles embedded in the same type of graphite matrix material in one group of said noncontiguously disposed channels, inserting breeder thorium particles in the same type of graphite matrix material in a second group of said noncontiguously disposed channel and inserting removable bars into a third group of said noncontiguously disposed channels; then hot pressing said graphite block containing said fissile uranium particles, breeder thorium particles, and removable bars, and then removing said bars to form the block fuel element having noncontiguous (1) uranium containing feed zones; (2) thorium containing breed zones and (3) cooling channels in said fuel free graphite matrix.



3,988,398
PROCESS FOR SPRAYING MOLTEN MATERIAL

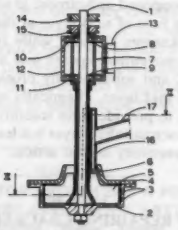
Johan W. Frenken, and Michael H. Willems, both of Geleen, Netherlands, assignors to Unie Van Kunstmestfabrieken, B.V., Utrecht, Netherlands

Filed Nov. 11, 1974, Ser. No. 523,005

Claims priority, application Netherlands, Nov. 15, 1973, 7315642

Int. Cl.² B01J *2/02*

U.S. Cl. 264—8 **2 Claims**



1. In a process of spraying molten material and collecting said material as solidified grains by:
A. feeding molten material into a symmetrical reservoir rotating about a vertical axis, and spraying said molten material through apertures in an upright wall of said reservoir, said reservoir accommodating a centrally positioned member rotating about said axis and provided with blades, and
B. allowing said molten material sprayed from said reservoir apertures to cool while falling, thereby forming solidified round granules, the improvement which comprises: C. rotating said bladed member having from 3 to 12 blades, the outer ends of said blades spaced a distance of at least 3mm from the inner surface of said upright wall of said reservoir, in the same direction as said reservoir at a speed at least 1.5 times that of said reservoir to thereby

raise by centrifugal force the static pressure of a layer of said molten material formed by centrifugal force on the inner surface of said wall of the reservoir to maintain a continuous discharge of molten material through said spray apertures.

3,988,399

HEAT RECOVERABLE ARTICLES AND METHODS THEREFOR

Joseph H. Evans, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 130,730, April 2, 1971, Pat. No. 3,847,721. This application June 10, 1974, Ser. No. 477,657

Int. Cl.² B32B *3/04*

U.S. Cl. 264—22 **4 Claims**

1. A method of forming an article involutely heat recoverable to an overlapping, generally cylindrical configuration which comprises differentially annealing a molecularly oriented unitary polymeric layer by heating one primary face thereof at a temperature and for a time sufficient to provide an anisotropic gradient from a first to a second primary face of said layer through the thickness thereof while restraining said layer from dimensional change, and subsequently crosslinking said layer, chemically or by irradiation to a degree sufficient to provide form stability at the melting temperature of the uncrosslinked polymer but less than that sufficient to prevent heat recovery of said article.

3. A method of forming an article heat recoverable to a configuration describing an elongate "S" in cross-section which comprises differentially annealing by heating opposite faces of opposite edge portions of a molecularly oriented unitary polymeric layer at a temperature and for a time sufficient to provide opposed anisotropic gradients from a first to a second primary face of said layer at the said edge portions through the thicknesses thereof, while restraining said edge portions against movement toward one another which would otherwise occur, and subsequently crosslinking at least said edge portions of said layer, chemically or by irradiation to a degree sufficient to provide form stability at the melting temperature of the uncrosslinked layer but less than that sufficient to prevent heat recovery of said article.

3,988,400

METHOD OF REPAIRING CRACKED WINDSHIELDS

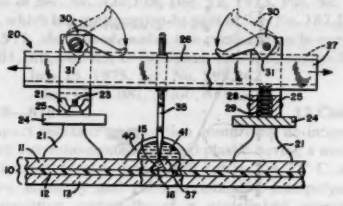
Edward F. Luhman, III, 13239 Joy Road, Detroit, Mich. 48228

Filed Apr. 24, 1975, Ser. No. 571,707

Int. Cl.² B29F *5/00*

U.S. Cl. 264—36 **1 Claim**

1. The method of repairing a generally conical crack in a windshield or the like having front and rear glass panels with an intermediate plastic lamination, the crack having an opening through the front glass panel and a conical plug of glass within the crack having its base resting against said lamination, comprising mounting a frame against the face of said front glass panel, forming a liquid barrier on the face of said front panel below said crack for receiving a curable plastic cement to fill said crack, supporting a pointed probe on said frame and maintaining said probe in a position normal to said windshield and adapted to contact the apex of said cone, and repeatedly applying and releasing pressure on said probe and thereby on the apex of said cone out of contact with the edges of said crack to work air bubbles out of said crack and to completely fill the same with said cement, and thereafter



curing said liquid to produce a firmly cemented bond between said cone and the interior of said crack.

3,988,401

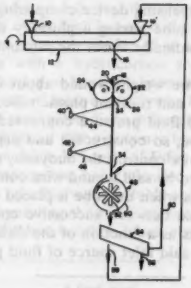
COMPRESSION MOLDING OF THERMOPLASTIC MATERIAL

Howard Edward Kasting; Roger Brown Staub, both of Somerville, N.J., and Ward John Klingebiel, Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 391,671, Aug. 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 149,566, June 3, 1971, abandoned. This application June 20, 1975, Ser. No. 588,846

Int. Cl.² B29C *29/00;* **B29D** *7/14;* **B29F** *5/00*

U.S. Cl. 264—37 **3 Claims**



1. The method of making molded bodies of thermoplastic material of uniform shape from a mixture of particulate thermoplastic virgin material and recycled fines formed in the method comprising: feeding both virgin thermoplastic material and recycled fines to the same heatermixer, separately both heating said virgin material and reheating said fines in said heater-mixer, said recycled fines being reheated for a shorter time than said virgin material is heated, mixing said virgin material and said fines to form a mixture, continuously compressing said mixture to form a sheet of interconnected molded bodies; disintegrating said sheet to form a plurality of separate molded bodies of uniform shape and fines and recycling said fines to said reheating step.

3,988,402

NON-COMBUSTIBLE MOLDING MATERIAL

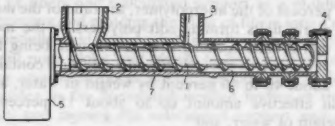
Harutoshi Ueda, Osaka; Naoyuki Suzuki, Nara, and Masami Nagao, Takatsuki, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 406,611, Oct. 15, 1973, which is a continuation-in-part of Ser. No. 183,077, Sept. 23, 1971, abandoned. This application Sept. 27, 1974, Ser. No. 510,130

Claims priority, application Japan, Sept. 24, 1970, 45-84199; Sept. 24, 1970, 45-84200; Sept. 25, 1970, 45-84468; Oct. 22, 1970, 45-93221; Nov. 16, 1970, 45-101231; Dec. 28, 1970, 46-126941; Dec. 29, 1970, 46-124120

Int. Cl.² C04B 43/02

U.S. Cl. 264—42 10 Claims



3. A process for producing a noncombustible molded article, which comprises:

i. mixing uniformly a molding composition consisting essentially of

a. 100 parts by weight of a hydraulic inorganic mixture consisting of an inorganic substance composed predominantly of silica selected from the group consisting of quartz rock, silica sand, aplite, pottery stone, silicate terra alba, diaspore, diatomaceous earth, fly ash, perlite, obsidian perlite, pumice microballoon, foamed shale pumice, foamed clay and vermiculite; and an inorganic substance composed predominantly of calcium oxide selected from the group consisting of slaked lime, quick lime and calcium carbonate, the molar ratio of the inorganic substance composed predominantly of calcium oxide to the inorganic substance composed predominantly of silica being from 0.5 to 1.2;

b. 10 to 200 parts by weight of mineral fibers selected from chrysotile asbestos, amosite asbestos, crocidolite asbestos, amphibole asbestos, tremolite asbestos, actinolite asbestos, rock wool, glass fiber and slag wool;

c. a substance selected from the group consisting of:

1. 1 to 10 parts of sulfur; and

2. 1 to 10 parts of metal sulfide selected from the group consisting of potassium sulfide, tin sulfide, iron sulfide, copper sulfide, sodium sulfide, barium sulfide, cadmium sulfide, cobalt sulfide, lead sulfide or zinc sulfide; and

d. 300 to 2000 parts by weight per 100 parts by weight of the total amount of components (a), (b) and (c), of water,

ii. molding the mixture so obtained,

iii. dehydrating the molded article at a pressure of at least 50 kg/cm² to a moisture content of 5 to 50% by weight, and

iv. heating the molded article at a temperature of 150° C to 210° C and at a vapor pressure of 5 to 20 atmospheres to harden it.

3,988,403

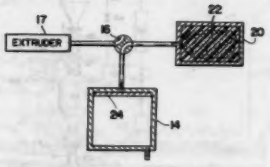
PROCESS FOR PRODUCING MOLDED STRUCTURAL FOAM ARTICLE HAVING A SURFACE THAT REPRODUCIBLY AND FAITHFULLY REPLICATES THE SURFACE OF THE MOLD

Richard G. Angell, Jr., Somerville; Robert J. Anderson, Whitehouse Station; Kenneth E. Hobbs, Helmetta, all of N.J.; David E. James, Elkview, W. Va., and B. Duane Marsh, Somerville, N.J., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 486,752, July 9, 1974, abandoned. This application May 22, 1975, Ser. No. 580,017

Int. Cl.² B29D 27/00; B29F 1/06

U.S. Cl. 264—45.5 18 Claims



1. In a process for injection molding foamed thermoplastic articles characterized by a foamed core, a relatively nonfoamed exterior shell, and a surface that reproducibly and faithfully replicates a predetermined portion of the inner surface of the mold in which the article was made, wherein a mixture comprising molten foamable thermoplastic material and blowing agent is introduced under pressure into a mold cavity defined by the inner surface of the mold, the mold cavity being maintained at a pressure below the foaming pressure of said mixture, whereby said mixture flows and expands in said mold cavity, and said thermoplastic material is rigidified while it is in said mold cavity, the improvement comprising the steps of:

a. maintaining said mixture in adhesive contact with said predetermined portion of said inner surface of the mold, thereby defining a polymer/mold interface as said mixture flows within said mold cavity;

b. maintaining a no-slip boundary condition between said mixture and said inner surface of the mold at said interface, as said mixture flows within said mold cavity; and

c. maintaining the temperature at said interface at a temperature of at least the replication temperature of said thermoplastic material, as said mixture flows within said mold cavity.

3,988,404

PROCESS FOR PRODUCING A FOAMED THERMOPLASTIC RESIN ARTICLE

Katsumi Orimo, Ichihara; Masao Azuma, Chiba; Takashi Shimano, and Shoji Yamamoto, both of Ichihara, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Oct. 2, 1974, Ser. No. 511,431

Claims priority, application Japan, Oct. 9, 1973, 48-113485; Dec. 1, 1973, 48-135591

Int. Cl.² B29D 27/00

U.S. Cl. 264—45.9 21 Claims

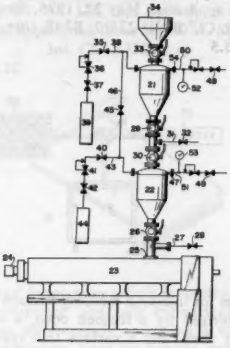
1. A process for producing a foamed thermoplastic resin insulation for a communication cable, comprising the steps of:

a. feeding into a high pressure tank a solid particulate thermoplastic resin containing a nucleating agent for foaming;

b. injecting a gas into said high pressure tank and maintaining the pressure of said gas at a high pressure P_1 for a predetermined time sufficient for said thermoplastic resin to quickly sorb said gas until a gas sorption quantity of predetermined value is reached;

c. lowering said gas pressure within said high pressure tank to a low pressure P_2;

d. transferring said gas sorbed thermoplastic resin within said high presure tank to a low pressure tank in which the gas pressure is held at a low pressure P_2 under which the gas sorption quantity of said thermoplastic resin is in the equilibrium state and wherein said pressure P_2 is lower than said pressure P_1 and higher than the atmospheric pressure;



e. feeding said thermoplastic resin within said low pressure tank into an extruder while said gas pressure is maintained at pressure P_2 and extruding said thermoplastic resin on a conductor to form said foamed thermoplastic resin insulation thereon; and

f. repeating said steps (a) to (d) to feed additional gas sorbed thermoplastic resin into said low pressure tank before said gas sorbed thermoplastic resin within said low pressure tank is all fed into said extruder.

3,988,405

PROCESS FOR FORMING THIN WALLED ARTICLES OR THIN SHEETS

Robert D. Smith, Raleigh, and William B. Upchurch, Wake Forest, both of N.C., assignors to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 132,192, April 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 772,053, Oct. 30, 1968, abandoned. This application Mar. 29, 1973, Ser. No. 346,044

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975

Int. Cl. C04b *35/64*

U.S. Cl. 264—63 **19 Claims**

1. A process for forming a thin unsupported sheet having a thickness of up to about 15 miles and having a green strength sufficiently high to permit manual handling which, upon sintering, is capable of providing a thin, non-porous article comprising the steps of

applying a casting composition to a substrate,

drying said casting composition on said substrate,

separating said flexible article from said substrate to form an unsupported flexible article having green strength sufficiently high to permit handling, and

sintering said flexible article, said casting composition consisting essentially of

A. at least about 95 percent by weight of a combination of the following three constituents:

1. from about 65 to 92 percent by weight of ceramic material having a mean particle size of from 0.2 to 12 microns and the particles having a maximum size of about 100 microns,

2. from about 5 to 35 percent by weight of an aqueous acrylic polymer emulsion binder composed of a water-insoluble interpolymer made up of

a. monomeric units having carboxylate groups from at least one polymerizable alpha, beta-unsaturated vinylidene carboxylic acid,

b. monomeric units from at least one polymerizable ester which by itself forms soft polymers and which is selected from the class consisting of esters of acrylic acid and primary alkanols from 1 to 18 carbon atoms, esters of acrylic acid and secondary alkanols of 1 to 18 carbon atoms, esters of methacrylic acid and primary alkanols of 5 to 18 carbon atoms, esters of methacrylic acid and secondary alkanols of 5 to 18 carbon atoms, and

c. monomeric units from at least one polymerizable monovinylidene compound which by itself forms a hard polymer and which is selected from the group consisting of alkyl methacrylates in which the alkyl group has 1 to 4 carbon atoms, tert.-amyl methacrylate, tert.-butyl acrylate, cyclohexyl acrylate, and cyclohexyl methacrylate, the monomeric carboxylate units constituting between 0.5 to 2.5 percent of the interpolymer, the ratio of the monomeric units forming soft polymers to the monomeric units forming a hard polymer being from about 9:1 to about 1:20, said emulsion containing about 40 to 60 percent by weight of water, and

3. an effective amount up to about 15 percent by weight of water, and

B. an effective amount up to 10 percent by weight of at least one surfactant.

3,988,406

METHOD OF PROVIDING A FIBROUS THERMOPLASTIC RESIN FOR DEPOLYMERIZATION THEREOF

Masafumi Nakamura; Tadahiro Fujii; Hiromi Nagashima, and Hiroshi Henmi, all of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 349,462, April 9, 1973, abandoned. This application Mar. 24, 1975, Ser. No. 561,627

Claims priority, application Japan, Apr. 13, 1972, 47-36243

Int. Cl.² C08F *8/50;* **B29C** *25/00*

U.S. Cl. 264—68 **9 Claims**

1. A method of depolymerizing a fibrous thermoplastic resin, comprising

A. compressing a fibrous thermoplastic resin mass by extrusion and, while compressing and during extrusion, melting only the surface portion of the mass,

B. cooling the mass to solidify the molten surface portion, thereby forming a shaped article having a specific gravity greater than ½ of the true specific gravity of the resin, said shaped article consisting of the fibrous thermoplastic resin mass having on its surface a crusty thin resin layer bonded to the resin mass,

C. cutting the shaped article into sections, and

D. introducing the resulting cut shaped article into a depolymerization chamber, wherein said article is subjected to heat depolymerization.

3,988,407
METHOD FOR PRODUCING MOLDED BODIES FROM CURABLE BINDER-BEARING GLASS FIBERS

Ulysses T. Gambill, and Gregory C. Brock, Jr., both of Granville, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

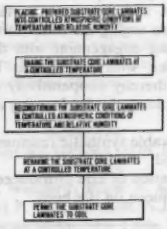
Division of Ser. No. 54,541, July 13, 1970, Pat. No. 3,764,243. This application July 30, 1973, Ser. No. 383,854
Int. Cl.[2] B29J 5/00; E04C 2/50
U.S. Cl. 264—118 6 Claims

1. The method of processing glass fibers to form molded bodies including disposing a mass of curable binder-bearing glass fibers on a reticulated support having spaced linear members lying in planes bisecting said mass at locations corresponding to the joint edges of said molded bodies, moving the mass of fibers and reticulated support to a molding station, compressing and molding the mass of fibers into a plurality of substantially rigid bodies while simultaneously partially severing said mass along said planes to form said molded bodies having unsevered fibers interconnecting said bodies, curing the binder in the connected molded bodies at the molding station, and moving the reticulated support and connected molded bodies away from the molding station.

3,988,408
STABILIZATION OF PRINTED CIRCUIT BOARD CORE LAMINATES

Frank W. Haining, Binghamton; Robert V. Rubino, Endicott, and Robert T. Wiley, Binghamton, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 16, 1974, Ser. No. 506,644
Int. Cl.[2] H05K 3/00; B32B 31/16
U.S. Cl. 264—156 2 Claims



1. A method for providing dimensional stability to a substrate core laminate for a printed circuit board, said laminate comprising a substrate core including a woven glass cloth impregnated with a resin, wherein said core is metallized on both sides with a conductive metal, which conductive metal is etched away from all but a border on both sides of said substrate core laminate, said method comprising the steps of:

drying said substrate core laminate at a temperature of 80° ± 20° F and a relative humidity of 40% ± 40%:

baking the substrate core laminate at a controlled temperature of 200° ± 50° F;

reconditioning the substrate core laminate for a period of between 1 hour and 24 hours at a relative humidity between 100% and 20% and at a controlled temperature of 80° ± 20° F;

rebaking the substrate core laminate at a controlled temperature of 200° ± 50° F;

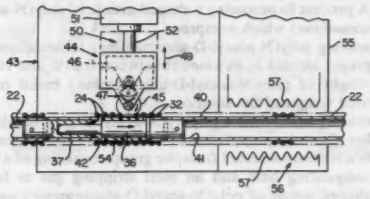
cooling the substrate core laminate; and

drilling through holes in the said substrate core laminate.

3,988,409
METHOD OF SEVERING A FLEXIBLE REINFORCED ELASTOMERIC CONDUIT SUPPORTED ON A PLURALITY OF ELONGATED END-TO-END RIGID MANDRELS

Homer N. Holden, Sylva; James P. Hunt, Clyde; Vernon D. Browning, Waynesville; Edward L. Hoglen, Candler, all of N.C., and Donald L. Kleykamp, Springboro, Ohio, assignors to Dayco Corporation, Dayton, Ohio

Division of Ser. No. 555,492, March 5, 1975, Pat. No. 3,966,104. This application Feb. 23, 1976, Ser. No. 660,751
Int. Cl.[2] B29C 17/14; B29D 23/05
U.S. Cl. 264—159 7 Claims



1. In a method of producing a continuous flexible reinforced elastomeric conduit which employs a plurality of elongated rigid mandrels interconnected in aligned end-to-end relation for supporting said conduit during continuous production thereof the improvement comprising an improved method of severing said conduit adjacent a joint between adjacent mandrels said method comprising the steps of, weakening said conduit with weakening means at a location adjacent each joint, disconnecting said mandrels and pulling the weakened conduit apart at each of said locations with pulling means so that each mandrel has a length of conduit therearound which is approximately equal to the length of the mandrel.

3,988,410
LUBRICANT FOR THE PRODUCTION OF NYLON AND POLYTETRAMETHYLENE TEREPHTHALATE NET-LIKE STRUCTURES

Ronald Leslie Larsen, Minneapolis, and William Bela Haffner, Woodbury, both of Minn., assignors to Conwed Corporation, St. Paul, Minn.

Continuation of Ser. No. 404,234, Oct. 9, 1973, abandoned, which is a continuation of Ser. No. 292,656, Sept. 27, 1972, abandoned. This application Mar. 21, 1975, Ser. No. 560,817
Int. Cl.[2] D01D 5/20
U.S. Cl. 264—167 5 Claims

1. A process for the continuous extrusion of nylon through a metal die therefor to form products having at least in part a net structure, the nylon being selected from the group consisting of nylon 6, nylon 6, 10, nylon 6, 13, nylon 11, nylon 12, nylon 13 and nylon 66 or polytetramethylene terephthalate said process comprising:

a. melt extruding a first plurality of spaced parallel strands of said polymer in molten state continuously through said metal die;

b. melt extruding a second plurality of spaced parallel strands continuously through said metal die at an angle to the direction of extrusion of the first plurality of strands;

c. each of said strands of said second plurality of spaced strands being joined to and connected with at least two of the spaced strands of the first plurality of strands at the crossing points in the net structure;

d. lubricating selected portions of said die metal with a polyolefin comprising a homopolymer of an olefin or copolymer of two or more olefins with a melt index ac-

cording to ASTM Test D 1238-70 Condition "E" of no greater than 100 in order to maintain the spacing between said strands between crossing points in the net structure by;

e. blending with said strand polymer for at least one of said sets of plurality of spaced strands from about 1.0 to about 10.0% by weight of said polyolefin.

3,988,411
SPINNING AND SHAPING POLY-(N-ACETYL-D-GLUCOSAMINE)

Richard Carl Capozza, Palo Alto, Calif., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 441,717, Feb. 11, 1974, abandoned. This application Mar. 14, 1975, Ser. No. 558,526

Int. Cl.² A61K *31/73;* **C07H** *5/06*

U.S. Cl. 264—184 **8 Claims**

1. A process fo preparing a shaped article of poly(N-acetyl-D-glucosamine) which comprises

dissolving poly(N-acetyl-D-glucosamine) in hexafluoroisopropyl alcohol in an amount between 0.01% and 10% by weight of poly(N-acetyl-D-glucosamine) based on the total weight of the solution,

extruding said solution of poly(N-acetyl-D-glucosamine) in hexafluoroisopropyl alcohol through an extrusion orifice

into a medium selected from the group consisting of a liquid coagulating bath and an inert stripping gas to form a shaped article of poly(N-acetyl-D-glucosamine) and

both treating said article to remove residual hexafluoroisopropyl alcohol, and stretching said article to orient the poly(N-acetyl-D-glucosamine).

3. A process for preparing a shaped article of poly(N-acetyl-D-glucosamine) which comprises

dissolving poly(N-acetyl-D-glucosamine) in hexafluoroacetone sesquihydrate in an amount between 0.01% and 10% by weight of poly(N-acetyl-D-glucosamine) based on the total weight of the solution,

extruding said solution of poly(N-acetyl-D-glucosamine) in hexafluoroacetone sesquihydrate through an extrusion orifice.

into a medium selected from the group consisting of a liquid coagulating bath and an inert stripping gas to form a shaped article of poly(N-acetyl-D-glucosamine) and

both treating said article to remove residual hexafluoroacetone sesquihydrate, and stretching said article to orient the poly(N-acetyl-D-glucosamine).

3,988,412
METHOD OF MAKING PIPE HAVING A LINER LAYER OF MIXED RESINS

Charles S. Woodson, Parkersburg, W. Va., assignor to Youngstown Sheet and Tube Company, Youngstown, Ohio

Continuation of Ser. No. 350,513, April 12, 1973, abandoned, which is a continuation of Ser. No. 155,319, June 21, 1971, abandoned, which is a division of Ser. No. 815,196, April 10, 1969, abandoned. This application May 13, 1975, Ser. No. 577,026

Int. Cl.² B29C *5/04;* **B29D** *3/02, 23/00*

U.S. Cl. 264—255 **2 Claims**

1. A method of producing reinforced plastic pipe consisting essentially of

positioning a reinforcing cylinder of fibrous material in a cylindrical mold,

introducing thermo-setting resin into the mold and spinning the mold to form the outer shell of a pipe,

said thermo-setting resin being of a quantity to just cover said fibrous material,

then introducing into the said outer shell of a pipe a dispersion of thoroughly mixed thermo-setting and thermo-plastic resins and rotating the pipe to evenly spread the dispersion over the previously formed shell while maintaining the thermo-plastic resin dispersed throughout the thermo-setting resin to form the inner shell of the pipe.

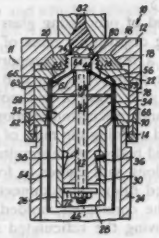
3,988,413
METHOD OF MOLDING A HEADPIECE ON A TUBULAR BODY

David Alvin Gaudet, Cincinnati, Ohio, and John Moss Wathen, Jr., Chester, N.J., assignors to American Can Company, Greenwich, Conn.

Division of Ser. No. 552,311, Feb. 24, 1975, Pat. No. 3,930,770, which is a continuation of Ser. No. 308,563, Nov. 21, 1972, abandoned, which is a division of Ser. No. 72,083, Sept. 14, 1970, abandoned. This application Aug. 25, 1975, Ser. No. 607,373

Int. Cl.² B29D *23/02, 23/20;* **B29F** *1/00*

U.S. Cl. 264—259 **5 Claims**



1. A method of molding a headpiece on a tubular body, comprising the steps of:

seating an open end of a tubular body within a cavity of a female forming member, said cavity being defined by a surface of said female forming member, said surface being configured to define an external surface of a headpiece for said tubular body;

disposing a washer, configured to define at least a portion of the internal surface of a headpiece and having a peripherally-expandable portion, within the tubular body adjacent its open end;

expanding said peripheral portion of said washer into sealing engagement with the inner surface of the tubular body, and in turn urging the outer surface of the tubular body into sealing engagement with the surface of said forming member, with the tubular body, washer and cavity surface thereby cooperatively defining at least a portion of a mold cavity for forming a headpiece on the body;

introducing a flowable synthetic resinous material into said mold cavity; and

effecting solidification of said introduced resinous material to form a headpiece on the body.

3,988,414
TREATMENT OF WASTE WATER FROM URANIUM ORE PREPARATION

Vladimir Klicka, Prague; Josef Mitas, Bystryce pod Hostynem, and Josef Vacek, Zliv, all of Czechoslovakia, assignors to Vyzkumny ustav chemickych zarizeni, Brno, Czechoslovakia

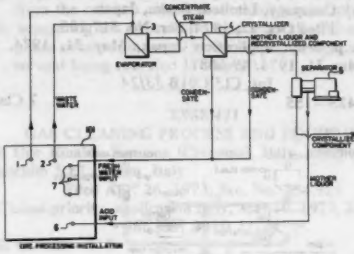
Filed Dec. 17, 1974, Ser. No. 533,714

Int. Cl.² C01G *43/00*

U.S. Cl. 423—18 **6 Claims**

1. In a process for the treatment of waste water containing inorganic salts and emerging from an installation for chemically preparing uranium ore, said installation having a first inlet for receiving fresh water and a second inlet for receiving acids, the improvement comprising the steps of evaporating the waste water to a concentrated solution, crystallizing the least soluble salt component in the solution, separating such component from the mother liquor, feeding the remaining mother liquor back to the second inlet of the installation as

replacement for the acids, and feeding condensate distilled from the waste water during the crystallizing step back to the



first inlet of the installation as a replacement for the fresh water.

3,988,415

RECOVERY OF PRECIOUS METAL VALUES FROM ORES

William Morrison Barr, 1512 S. 19th East, Salt Lake City, Utah 84108

Continuation-in-part of Ser. No. 369,920, June 14, 1973, abandoned. This application July 22, 1974, Ser. No. 490,354

Int. Cl.² C01G *55/00, 5/00, 7/00*

U.S. Cl. 423—22 **10 Claims**

1. A process for the recovery of metals selected from the group consisting of gold, silver, platinum and members of the platinum group from ores containing these metals, which comprises:

admixing with the ore, a mixture of dry chloride and nitrate compounds which upon reaction with the ore or which by thermal decomposition yield the chloride and nitrate ion, respectively,

heating said mixture in the absence of air and oxygen to a temperature of from 400° F to 1600° F, to effect reaction of the metal values with said compounds and volatilization of products,

collecting the volatilized products,

separating the desired metal values therefrom, and further separating from the non-volatilized residue any of said metal values contained therein.

3,988,416

ELEVATED PRESSURE OPERATION IN THE CUPRION PROCESS

Herbert E. Barner, Westford; Roger N. Kust, Acton, both of Mass., and Robert P. Cox, Wyckoff, N.J., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed June 13, 1974, Ser. No. 479,153

Int. Cl.² C01G *3/14, 39/00, 51/12, 53/12*

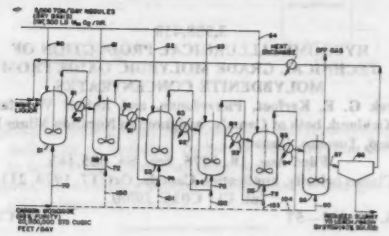
U.S. Cl. 423—33 **15 Claims**

7. In a process in which one or more metal values selected from the group of copper, nickel, cobalt and molybdenum are recovered from a manganese containing ore by introducing the ore into reaction vessels containing an aqueous ammoniacal-ammonium carbonate solution and cuprous ions and in which the cuprous ions reduce the manganese oxides in the ore and are oxidized to cupric ions to enable the metal values in the ore to be solubilized in the aqueous ammoniacal-ammonium carbonate solution and in which cuprous ions are continuously regenerated by reacting cupric ions in the aqueous phase with carbon monoxide in the gaseous phase wherein the improvement comprises:

a. maintaining the amount of cuprous ions in a reaction vessel greater than 2 grams per liter by injecting the manganese containing ore into several vessels containing cuprous ions and connected in series in amounts calculated to reduce the possibility that the manganese containing ore will exhaust the supply of cuprous ions by reacting completely with it to enable the regeneration of cuprous ions from cupric ions through the formation of a complex having the formula [CuCOOH] by the reaction of cuprous ions, carbon monoxide and hydroxide ions in accordance with the following equation:

$$Cu^{+}(solution)+CO(solution) \quad CuCO\ (solution)$$

$$CuCO^{+}(solution)+OH^{-}(solution) \quad [CuCOOH]\ (solution);$$



the formation of [CuCOOH] being the rate limiting chemical reaction for the reduction of cupric ions with carbon monoxide;

b. flowing the manganese containing ore through a series of said reaction vessels containing cuprous ions to form a reaction product; and,

c. removing heat as required from the reaction product entering each subsequent reaction vessel so that the temperature within each reaction vessel during the reaction is within the range of 35°–55° C.

3,988,417

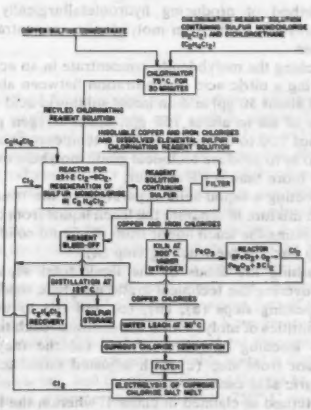
PROCESS FOR CHLORINATING METAL SULFIDE MATERIALS

Samuel M. Polinsky, Salt Lake City, Utah, assignor to Kennecott Copper Corporation, New York, N.Y.

Filed June 10, 1971, Ser. No. 151,819

Int. Cl.² C01B *17/06;* **C01G** *49/10, 3/04*

U.S. Cl. 423—40 **1 Claim**



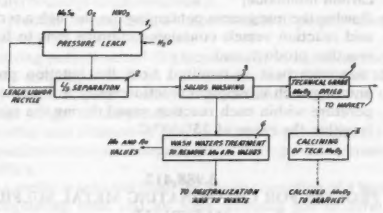
1. A process for chlorinating a concentrate of copper sulfide minerals to produce metal chlorides, comprising: contacting said concentrate with an amount of a chlorinating reagent

solution at a temperature of about 80° C and for a time period of about 30 minutes to chlorinate the metal values and to solubilize the the sulfur values in an unreacted state, thereby producing water-soluble metal chlorides which are insoluble in the reagent solution and elemental sulfur which is dissolved in the reagent solution, said chlorinating reagent solution containing S_2Cl_2 and dichloroethane, said S_2Cl_2 being present in the reagent solution in an amount at least stoichiometric with the metal values in the sulfide materials, and recovering the metal product from the reaction mixture separately from the elemental sulfur.

3,988,418
HYDROMETALLURGICAL PRODUCTION OF TECHNICAL GRADE MOLYBDIC OXIDE FROM MOLYBDENITE CONCENTRATES

Derek G. E. Kerfoot, Pierrefonds, and Robert W. Stanley, Kirkland, both of Canada, assignors to Noranda Mines Limited, Toronto, Canada

Filed Aug. 18, 1975, Ser. No. 605,443
Claims priority, application Canada, Oct. 17, 1974, 211640
Int. Cl.² C01G *39/00*
U.S. Cl. 423—57 **21 Claims**



1. Method of producing hydrometallurgically technical grade molybdic oxide from molybdenite concentrates, which comprises:

a. leaching the molybdenite concentrate in an acid medium having a nitric acid concentration between about 25 gpl and about 50 gpl and an initial sulphuric acid concentration of nil to about 750 gpl, under oxygen pressure of about 100 to 250 psig and at a temperature above 115° C so as to produce technical grade molybdic oxide having not more than 0.1% sulphur;

b. effecting a liquid-solid separation of the resultant reaction mixture to separate the leach liquor from the solids;

c. recycling the leach liquor from the liquid-solid separation step back to the leaching step (a);

d. washing the solids of the liquid-solid separation and recovering the technical grade molybdic oxide; and

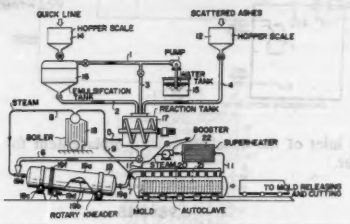
e. repeating steps (a), (b), (c) and (d) to treat further quantities of molybdenite concentrate, each time using in the leaching operation of step (a) the recycled leach liquor from step (c) with adjusted nitric acid and sulphuric acid concentrations.

10. Method as claimed in claim 1, wherein the leach liquor from the liquid-solid separation is partially neutralized with a basic reagent which forms an insoluble sulphate, up to a pH of about 0.9, then another liquid-solid separation is effected and the obtained liquor is recycled back to the leaching step.

3,988,419
PROCESS FOR PRODUCING CALCIUM SILICATE INSULATION

Ken Mori, Kobe, Japan, assignor to Kansai Thermal Insulating Industry Company, Limited, Osaka, Japan

Filed Oct. 22, 1974, Ser. No. 517,105
Claims priority, application Japan, May 31, 1974, 49-60870; May 31, 1974, 49-60871
Int. Cl.² C01B *33/24*
U.S. Cl. 423—155 **7 Claims**



1. A process for producing calcium silicate insulation consisting of synthetic xonotlite crystals and having a bulk specific gravity of 0.10 to 0.20 g/cm³, entirely free from asbestos fibers, which comprises:

a. preparing a mixture of (1) very finely scattered ashes composed principally of finely divided amorphous silica; (2) lime raw materials; and (3) water;

b. stirring and heating the scattered ashes with the lime raw materials and water to thereby obtain a gel;

c. kneading the gel gently, without breaking the gel, under saturated steam pressure to convert the gel to a viscoelastic material just prior to transition into xonotlite crystals;

d. pouring the viscoelastic material in a mold; and

e. treating the viscoelastic material in the mold with saturated steam, thereby forming crystals, and then treating the viscoelastic material under superheated steam, thereby effecting growth and drying of the crystals.

3,988,420
PROCESSES FOR THE MANUFACTURE OF FEED-GRADE DICALCIUM PHOSPHATE AND PHOSPHORIC ACID

Dalith Loewy, and Chava Fink, both of Haifa, Israel, assignors to Israel Chemicals Ltd., Tel Aviv, Israel

Filed Apr. 22, 1975, Ser. No. 570,517
Claims priority, application Israel, June 5, 1974, 44977
Int. Cl.² C01B *25/16*
U.S. Cl. 423—157 **6 Claims**

1. A combined process for the manufacture of feed-grade DCP and pure phosphoric acid from phosphate rock which comprises:

a. reacting excess comminuted calcareous phosphate rock with aqueous solutions of a mineral acid selected from the group consisting of hydrochloric acid, phosphoric acid and nitric acid in amounts such that the free acidity in the dissolution liquor does not exceed 60%;

b. separating the clear solution from the solids;

c. precipitating the feed-grade DCP from the clear solution obtained in step (b) by the addition of calcium hydroxide, calcium carbonate or mixtures thereof;

d. reacting the solids obtained in step (b) with hydrochloric acid at a temperature between ambient temperature and approximately 120° C to produce an acidulant containing phosphoric acid and calcium chloride;

e. separating the acidulant containing phosphoric acid and calcium chloride obtained in step (d), leaving a residue of insoluble matter;

f. extracting the acidulant separated in step (e) with a phosphoric acid-miscible, calcium chloride-immiscible or-

ganic solvent selected from butanols, pentanols and mixtures thereof, to form a mutually immiscible brine phase containing calcium chloride and a phosphoric acid-solvent extract phase;

g. separating the phosphoric acid-solvent extract phase from the calcium chloride-containing brine phase and

h. separating the phosphoric acid from the solvent extract phase obtained in s tep (g), said phosphoric acid-miscible solvent being recycled to step (f).

3,988,421

GAS CLEANING PROCESS AND EQUIPMENT

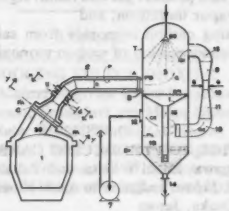
Noè Ugo Rinaldi, Soresina (Cremona), Italy, assignor to Tecnochim S.r.l., Milan, Italy

Filed Apr. 26, 1973, Ser. No. 354,919

Claims priority, application Italy, May 10, 1972, 24127/72

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—210 **3 Claims**



1. A process for treating combustible gas carrying suspended solid particles wherein the gas and suspended particles pass from a furnace zone into a duct in which the gas undergoes combustion with induced air while passing to a further treatment zone the steps comprising: introducing a flow of air through an annular opening in the duct located near the downstream end thereof and imparting a rotary motion to said flow of air about the axis of the duct to thereby centrifugally form a protective air layer along the inner surface of the duct, introducing other air into the duct near the downstream end thereof whereby combustion of the gas is effected in the duct; passing the gas into contact with a spray of wash liquid in the upper portion of a chamber to remove at least some solid particles from the gas, the gas having a substantial component of movement which is counter current to the direction of the spray; passing the gas out of the upper portion of the chamber to a venturi scrubber; injecting further wash liquid into the gas in the scrubber whereby wash liquid particles become suspended in the gas; passing the gas and suspended wash liquid particles out of the scrubber along a curved path to thereby remove some of the suspended liquid particles by centrifugal force; then passing the gas and remaining suspended particles tangentially into a different portion of said chamber to thereby remove the remainder of the suspended liquid particles by centrifugal force.

3,988,422

METHOD OF TREATING CONVERTER GAS

Berthold Krüger, Wanne-Eickel, Germany, assignor to Gottfried Bischoff Bau Kompl. Gasreinigungs- und Wasserrückkuhlungsanlagen KG, Essen, Germany

Filed Oct. 7, 1974, Ser. No. 512,606

Claims priority, application Germany, Oct. 11, 1973, 2350956

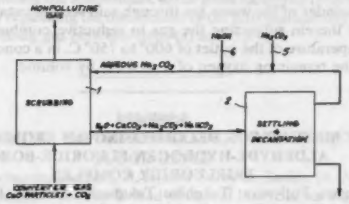
Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—232 **4 Claims**

1. A method of treating a gas containing calcium-oxide particles, said method comprising the steps of:

scrubbing said gas with a liquid consisting essentially of an aqueous solution of alkali-metal carbonate or alkali-metal hydrogen carbonate to form an insoluble carbonate sheath on said particles prior to the solubilization of calcium ion therefrom and entraining the resulting calcium-carbonate coated particles with the solution;

separating the entrained particles from said solution by settling and decantation of the solution;



thereafter adding water to said solution and replenishing the carbonate or hydrogen carbonate concentration thereof to form a regenerated solution; and

thereafter scrubbing additional quantities of said gas with said regenerated solution.

3,988,423

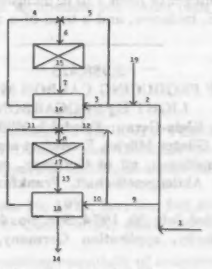
METHOD FOR REMOVING HARMFUL MATERIALS FROM WASTE GAS

Tetsuya Ohrui, Niihama; Yasuhito Sakakibara, Saijo; Tetsuo Hoshikuma, Niihama; Osamu Imai, Niihama, and Masaaki Iwasa, Niihama, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Oct. 11, 1974, Ser. No. 514,081

Int. Cl.[2] B01D *53/34;* **A62D** *3/00*

U.S. Cl. 423—236 **4 Claims**



1. A method for removing hydrocarbons, nitrogen oxides, cyanides, nitrile compounds and carbon monoxide from a waste gas exhausted in a process for producing acrylonitrile by the ammoxidation of propylene, which comprises dividing the waste gas exhausted after the absorption of acrylonitrile into two flows, mixing a part of the divided waste gas with air in an amount necessary for the combustion of the combustible gases contained in the entire waste gas, subjecting a part of the mixed gas thus obtained to heat exchange with the gas of the outlet of a first catalyst layer for the combustion of the combustible gases contained in said waste gas, combining the heated gas thus obtained with the remaining part of the mixed gas, thereby preheating the mixed gas to a temperature of 200° to 450° C., passing the preheated mixed gas through said first catalyst layer wherein at least one noble metal is dispersed on an alumina carrier, and therein subjecting the gas to oxidative combustion at a temperature of 650° to 750° C. in the presence of an excess amount of oxygen to give a combustion gas, combining the resulting combustion gas with the divided remainder of the waste gas which is preheated by subjecting a

part of said divided remainder of the waste gas to heat exchange with the gas of the outlet of a second catalyst layer for the reduction of nitrogen oxides and combining the heated gas thus obtained with the remaining part of the divided remainder of the waste gas, and thereby controlling the temperature of said combustion gas to 250° to 450° C., passing the resulting mixture of the combustion gas with the preheated divided remainder of the waste gas through said second catalyst layer, and therein subjecting the gas to reductive combustion at a temperature of the outlet of 600° to 750° C. in a concentration of the remaining oxygen of 0 to 0.5% by volume.

3,988,424

METHOD FOR DECOMPOSING AN AROMATIC ALDEHYDE-HYDROGEN FLUORIDE-BORON TRIFLUORIDE COMPLEX

Susumu Fujiyama; Takehiko Takahashi; Minoru Takagawa, and Shigeki Ozao, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

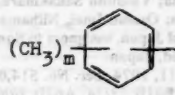
Filed Dec. 11, 1975, Ser. No. 639,698

Claims priority, application Japan, Dec. 27, 1974, 49-148840

Int. Cl.² C07C *45/14*; C01B *35/06*

U.S. Cl. 423—293 **7 Claims**

1. A process for decomposing an aromatic aldehyde-hydrogen fluoride-boron trifluoride complex to obtain an aromatic aldehyde, hydrogen fluoride and boron trifluoride separately, characterized by carrying out the decomposition in the presence of a decomposing agent represented by the formula



wherein *n* is integer of from 1 to 6, inclusive, and *m* is integer of from 0 to 5, inclusive, and a total of *n* and *m* is 6 or less.

3,988,425

PROCESS OF PRODUCING CARBON MONOXIDE FROM LIGHT HYDROCARBONS

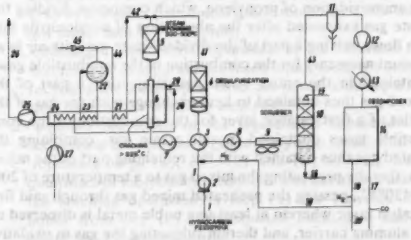
Heinz Jockel, Klein-Gerau; Friedrich Wilhelm Möller, Seulberg; Hans Günter Mörtel, Frankfurt am Main, and Heiner Tanz, Sprendlingen, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 30, 1974, Ser. No. 493,203

Claims priority, application Germany, Aug. 16, 1973, 2341373

Int. Cl.² C01B *31/00, 1/18*

U.S. Cl. 423—415 A **5 Claims**



1. Process for producing carbon monoxide from light hydrocarbon feedstock having an average C number not greater than 15 and containing sulfur impurities which comprises:

a. mixing the hydrocarbon feedstock with 0.02 – 0.1 standard cubic meter hydrogen per kilogram of hydrocarbon feedstock;

b. subjecting this mixture to desulfurization;

c. mixing the desulfurized mixture with superheated process steam in a ratio of 1.1 – 1.7 moles per mole of carbon in the feedstock;

d. reacting the resulting mixture from (c) in contact with a catalyst containing 35 – 70 percent by weight of nickel in a reaction zone at temperatures of 300° – 500° C and at a pressure of 10 – 20 kilograms per square centimeter to produce a high methane rich gas;

e. reducing the pressure of said rich gas by an amount of 4 – 12 kilograms per square centimeter and reacting said rich gas in a tubular heating zone in contact with an indirectly heated catalyst containing 10 – 30 percent by weight of nickel at a temperature in the range of 850° – 980° C to produce a product gas which is rich in carbon monoxide and hydrogen;

f. cooling said product gas and removing carbon dioxide and water vapor therefrom; and

g. separating carbon monoxide from said cooled product gas by condensation of carbon monoxide.

3,988,426

METHOD FOR PRODUCING CARBON FIBERS

Tsutomu Ogawa; Eiichi Wakita, and Takahiro Kobayashi, all of Fujishi, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

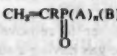
Filed Feb. 20, 1974, Ser. No. 444,133

Claims priority, application Japan, Feb. 24, 1973, 48-21757

Int. Cl.² C01B *31/02*; D01F *9/12, 6/40*

U.S. Cl. 423—447.1 **12 Claims**

1. A method for producing carbon fibers which comprises subjecting acrylonitrile polymer fibers to a preliminary heat treatment in an oxidative atmosphere at a temperature of 180° to 300° C. and a subsequent carbonization heat treatment at a temperature in the range from 700° C to about 2800° C which acrylonitrile polymer fibers comprise a copolymer composed mainly of acrylonitrile and a comonomer expressed by the general formula of



wherein R is hydrogen or methyl group, A is an alkoxy group having 1 – 4 carbon atoms, B is a halogenated alkoxy group having 1 – 4 carbon atoms wherein halogen is chlorine, bromine or iodine, *n* is an integer of 0 – 2, *m* is an integer of 0 – 2 and $n + m$ is 2, the contents of acrylonitrile and said comonomer in said copolymer being more than 85% by weight and 0.05 – 15% by weight based upon the weight of said copolymer, respectively.

3,988,427

FLAME REACTION PROCESS FOR PRODUCING HYDROGEN BROMIDE

Joseph A. Bossler, III, Greenwell Springs, La., and Robert J. Fanning, Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

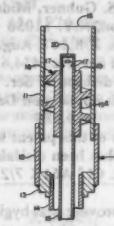
Continuation-in-part of Ser. No. 472,444, May 22, 1974, abandoned. This application Mar. 7, 1975, Ser. No. 556,493

Int. Cl.² C01B *7/12*

U.S. Cl. 423—487 **2 Claims**

1. In a process for reacting gaseous bromine and gaseous hydrogen to produce hydrogen bromide, the improvement which comprises establishing a helical flow of bromine in a cylindrical enclosure, feeding hydrogen radially outward into the bromine in the region of its helical flow and continuously

feeding the resultant helico-spiraling flow of bromine and hydrogen into a flame maintained in the vicinity of the discharge end of said enclosure whereby a hemispherical or mushroom shaped low velocity flame is produced.



3,988,428

SULFUR-PRODUCING PROCESS AND SYSTEM FOR PRODUCING SULFUR DIOXIDE

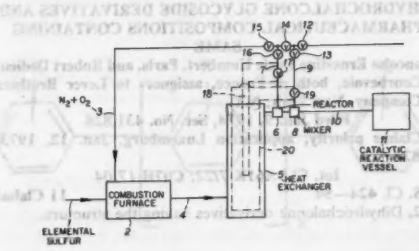
Karl-Heinz Dorr, Mainz; Siegfried Bielz, Frankfurt am Main; Dan Constantinescu, Frankfurt am Main; Hubert Vollmer, Frankfurt am Main; Rudolf Beuchelt, Cologne; Hans Guth, Bergisch Neukirchen; Peter Reher, Schildgen-Nittum, and Herman Wieschen, Cologne, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 74,629, Sept. 23, 1970, abandoned. This application Apr. 12, 1974, Ser. No. 460,614

Claims priority, application Germany, Sept. 26, 1969, 1948754

Int. Cl.[2] C01B *17/54*

U.S. Cl. 423—543 **1 Claim**



1. In the process for the production of sulfur dioxide in which sulfur is burnt with a stoichiometric deficiency of oxygen with a gas containing nitrogen and oxygen and the resulting gas mixture is thereafter burnt with additional gas containing nitrogen and oxygen to transform substantially all of the sulfur to sulfur dioxide, the improvement for controlling the temperature of the sulfur dioxide-containing product gas and ensuring the absence of nitrous oxide therein which comprises:

a. initially producing an oxygen-free gas containing sulfur dioxide and residual sulfur by burning a quantity of elemental sulfur with a gas containing nitrogen and oxygen at a temperature of 1300° C to 1600° C, the latter gas being present in an amount sufficient to provide 70 to 95% of the stoichiometric quantity of oxygen necessary to react with said quantity of elemental sulfur to completely convert it to sulfur dioxide;

b. thereafter passing the oxygen-free gas formed in step (a) through a circulated-coolant heat exchanger to abstract heat therefrom and reduce the temperature of the latter gas to a temperature above its dewpoint;

c. afterburning the gas cooled in step (b) at a temperature below 1000°C with a further supply of said gas containing nitrogen and oxygen to complete the stoichiometric quantity of oxygen required to convert said quantity of elemental sulfur to sulfur dioxide and corresponding to 30% to 5% of said stoichiometric quantity of oxygen; and

d. controlling the temperature of the gases emerging from step (c) by regulating the distribution of the nitrogen and oxygen containing gas between steps (a) and (c).

3,988,429

KIT FOR THE RAPID PREPARATION OF ^{99m}Tc RED BLOOD CELLS

Powell Richards, Bayport, N.Y., and Terry D. Smith, St. Ann, Mo., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 16, 1975, Ser. No. 568,809

Int. Cl.[2] A61K *29/00, 43/00*

U.S. Cl. 424—1 **4 Claims**

1. The method of labeling red blood cells with ^{99m}Tc comprising the steps of

a. supplying a sample of blood to a container having therein an anticoagulant, a freeze-dried stannous reagent consisting of stannous citrate present in the range of about 0.10 to 0.25 μg of the stannous ion for each ml. of the blood sample, and a metal chelate stabilizer to provide bulk;

b. incubating the resulting mixture until all of the solids are dissolved;

c. adding sterile saline solution;

d. centrifuging the contents of said container to form packed red blood cells;

e. withdrawing some of said packed red blood cells;

f. mixing said packed red blood cells with previously prepared saline solution of $Na^{99m}TcO_4$; and

g. incubating the technetium-red blood cells mixture with gentle mixing.

3,988,430

IMMUNOASSAY OF ANTIPYRINE

William Ross Dixon, Dumont, and Alexander Wood, Hohokus, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 10, 1975, Ser. No. 548,656

Int. Cl.[2] G01N *33/00;* A61K *39/00*

U.S. Cl. 424—1.5 **11 Claims**

1. An antigen consisting essentially of antipyrine or a derivative thereof covalently bonded to an immunogenic carrier material through a linking group, wherein said antipyrine derivative is antipyrine substituted in the 4-position with a functional group that will react via amine-ester or amide bond formation with the said linking group.

3,988,431

RADIOASSAY OF FOLATES

Joan K. Givas, Springfield, N.J., and Sidney Gutcho, Monsey, N.Y., assignors to Becton, Dickinson and Company, Rutherford, N.J.

Filed Dec. 12, 1974, Ser. No. 532,038

Int. Cl.[2] A61K *43/00;* G21H *5/02;* G01T *1/16*

U.S. Cl. 424—1.5 **8 Claims**

1. In a process for preparing a standard for the radioassay of folate by incubation of radiolabeled folate, standard folate and folate binder, the improvement comprising:

employing folic acid as the standard and effecting the incubation at a pH of from 9.2 to 9.4.

3,988,432
FLAVOR AND FRAGRANT COMPOSITIONS

Robert John Steltenkamp, Somerset, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 125,792, March 18, 1971, abandoned. This application Nov. 9, 1973, Ser. No. 414,392
Int. Cl.² A61K 7/16, 7/15, 47/00
U.S. Cl. 424—49 7 Claims

1. A process for making compositions having the flavor and fragrance of steam-distilled natural lime oil comprising the steps of refluxing a mixture of citral, an acid selected from the group consisting of mineral acids and organic acids and water for 0.5 to 5 hours at 25–100° C., the ratio of citral to acid being from about 1:1 to 20:1 and said mixture having a pH of less than 5.5, steam distilling the refluxed material, recovering the distillate, and adding an effective amount of the distillate obtained from the distilling of the refluxed material to a carrier material in which the flavor or fragrance of the lime oil is desired.

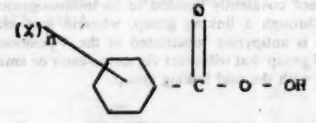
3,988,433
ORAL COMPOSITIONS FOR PREVENTING OR REMOVING STAINS FROM TEETH

James John Benedict, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 387,560, Aug. 10, 1973, abandoned. This application June 11, 1975, Ser. No. 586,005
Int. Cl.² A61K 7/20
U.S. Cl. 424—53 8 Claims

1. A tooth-stain bleaching composition in concentrate form consisting essentially of:

I. from about 2% to about 50% of a bleaching compound selected from the group consisting of:
aryl peroxyacids having the formula:



wherein at least one X is a substituent group having a Hammett sigma constant equal to or greater than +0.2, and n is a number from 1 to 3, said substituents being either in the meta or para portion; and

II. the balance an inert organic diluent which is an organic liquid or soft wax selected from the group consisting of:

A. saturated fatty acids containing from about 8 to about 22 carbon atoms; and

B. saturated acylate esters containing from about 10 to about 80 carbon atoms wherein the acyl group contains from about 2 to about 22 carbon atoms and from 1 to about 3 carboxyl groups, and the alcohol group contains from 1 to about 18 carbon atoms and from 1 to about 6 hydroxy groups.

3,988,434
DENTAL PREPARATION

Murray L. Schole, 487 Munroe Ave., North Tarrytown, N.Y. 10591, and Richard S. Gubner, Middle Neck Road, Sands Point, Port Washington, N.Y. 11050

Continuation of Ser. No. 278,247, Aug. 7, 1972, abandoned, which is a division of Ser. No. 434,678, Feb. 23, 1965, abandoned, which is a division of Ser. No. 778,329, Dec. 5, 1958, abandoned. This application Dec. 3, 1974, Ser. No. 529,189
The portion of the term of this patent subsequent to Oct. 17, 1989, has been disclaimed.
Int. Cl.² A61K 7/22
U.S. Cl. 424—54 4 Claims

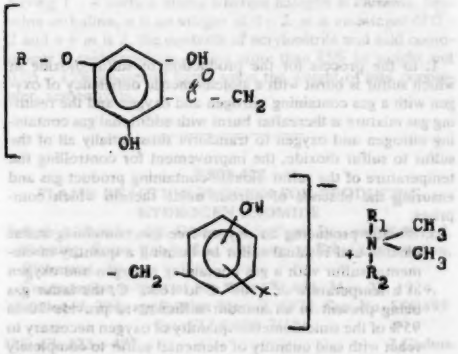
1. The method of improving oral hygiene by applying to the teeth a water-containing dentifrice comprising a substantially stable solution of a non-toxic, water-soluble ionic strontium chelate of ethylene diamine tetracetic acid selected from (a) strontium disodium ethylene diamine tetracetate and (b) the reaction product in aqueous medium of a water-soluble salt of ethylene diamine tetracetic acid and a molar equivalent amount of a pharmacologically innocuous water-soluble strontium salt that can react in an aqueous medium with such ethylene diamine tetracetic acid salt to give the corresponding strontium ethylene diamine tetracetate chelate, the strontium ethylene diamine tetracetate chelate constituting an amount sufficient to provide improvement in treatment of gingivitis and periodonitis up to about 10%, measured as the strontium cation of said chelate, by weight of said dentifrice, and said dentifrice being characterized by the substantial absence of substances which precipitate said strontium.

3,988,435
DIHYDROCHALCONE GLYCOSIDE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

Francoise Ernestine Lucie Humbert, Paris, and Robert Dedieu, Courbevoie, both of France, assignors to Lever Brothers Company, New York, N.Y.

Filed Jan. 9, 1974, Ser. No. 431,826
Claims priority, application Luxemburg, Jan. 12, 1973, 66823
Int. Cl.² A61K 7/22; C07H 17/04
U.S. Cl. 424—54 11 Claims

2. Dihydrochalcone derivatives having the structure:



in which
R is neohesperidosyl
X is H or OCH_3
R_1 is C_{12} or C_{14} alkyl
R_2 is CH_3, benzyl or methyl naphthyl.

3,988,436

SUNSCREENING METHOD USING RICE BRAN OIL

Ching C. Loo, Northridge, Calif., assignor to Carnation Company, Los Angeles, Calif.

Filed Feb. 11, 1974, Ser. No. 441,082
Int. Cl.² A61K 7/42
U.S. Cl. 424—59 3 Claims

1. A method of protecting the skin against ultraviolet radiation having a wave length of 2950 to 3150 A. consisting essentially of applying to the skin to be protected rice bran oil in an amount sufficient to absorb ultraviolet radiation having said wave length.

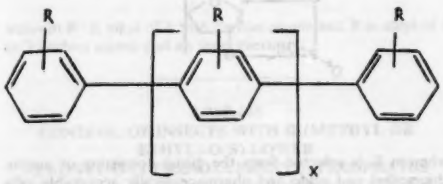
3,988,437

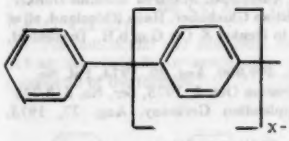
SUNTAN COMPOSITION CONTAINING FLUORESCENT COMPOUNDS

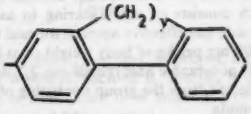
Hugh Bradner, La Jolla, Calif., assignor to Research Corporation, New York, N.Y.

Filed Mar. 25, 1974, Ser. No. 454,558
Int. Cl.² A61K 7/42
U.S. Cl. 424—59 9 Claims

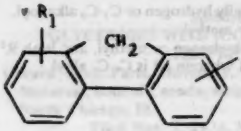
1. A composition adapted for application to the human skin which provides substantial protection against erythemal radiation and promotes non-erythemal tanning which consists essentially of an inert, cosmetic carrier suitable for application to the human skin having distributed therein from about 1 to about 25% by weight of a fluorescent compound which is non-toxic to the human skin and which absorbs ultra-violet radiation of wavelengths erythemal to the human skin between about 2900 A and about 3150 A and which converts said absorbed radiation into fluorescent emission having wavelengths which non-erythemally tan the human skin in the range of between about 3150 A and about 4000 A, said fluorescent compound having one of the structural formulae:







, or



wherein

R is hydrogen, lower alkyl or lower alkoxy;
x is an integer from 1 to 6;
y is 1 or 2; and,
R_1 is hydrogen or lower alkyl.

3,988,438

HAIR CONDITIONING SHAMPOO

Morris Weinstein, Paramus, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Jan. 10, 1975, Ser. No. 540,353
Int. Cl.² A61K 7/06
U.S. Cl. 424—70 1 Claim

1. A hair conditioning shampoo composition which comprises water, from 0.5 parts to 5.0 parts of the triethanolamine salt of alginic acid and an effective amount of a cleansing fraction comprising the triethanolamine salts of long chain fatty acids of 12 to 16 carbon atoms and a C_{18} unsaturated carbon acid in combination with the triethanolamine salts of the condensation products of a fatty acid chloride of 12 to 16 carbon atoms with a protein hydrolysate.

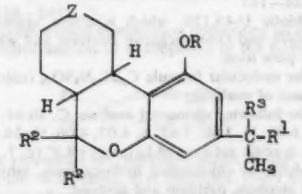
3,988,439

DIBENZO[b,d]PYRANONE DISPERSIONS

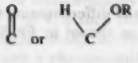
Arvind L. Thakkar, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 413,012, Nov. 5, 1973, Pat. No. 3,920,809.
This application June 23, 1975, Ser. No. 589,311
Int. Cl.² A61K 31/74
U.S. Cl. 424—78 2 Claims

1. A dispersion of 2–20 parts of polyethyleneglycol having a molecular weight in the range 1000–6000, with one part of a compound of the formula



wherein Z is



wherein each R is individually hydrogen or C_1-C_3 alkanoyl,
wherein R^3 is hydrogen or methyl,
wherein each R^2 is either hydrogen or methyl, and both R^2 groups are the same and wherein R^1 is C_1-C_6 alkyl.

3,988,440

REMEDY FOR TREATING GASTRITIS, GASTRIC AND DUODENAL ULCERS

Ivan Georgiev Bogdanov, Sofia, Bulgaria, assignor to DSO "Pharmachim", Sofia, Bulgaria

Filed Oct. 10, 1974, Ser. No. 513,845
Claims priority, application Bulgaria, Oct. 11, 1973, 24712
Int. Cl.² A61K *35/74, 37/02*
U.S. Cl. 424—115 **1 Claim**

1. A preparation for treating gastritis, and gastric and duodenal ulcers which comprises dried soya medium, sucrose and dried Lactobacillus Bulgaricus culture (ATCC NO. 21815) which is obtained by cultivating said culture in soya medium under anaerobic conditions at a temperature between 35° to 42° C followed by spray drying said culture in a spray dryer at an entrance temperature of 150°–190° C and an exit temperature of 70°–85° C, said preparation having a chemical composition consisting of 25–35% protein, 45–52% sucrose, and 4–5.5% lactic acid.

3,988,441

ANTIBIOTIC U-43,120 AND PROCESS FOR PREPARING SAME

Ladislav J. Hanka, and Paul F. Wiley, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 2, 1975, Ser. No. 619,074
Int. Cl.² A61K *35/74*
U.S. Cl. 424—117 **2 Claims**

1. Antibiotic U-43,120, which is active against various Gram-positive and Gram-negative bacteria and which in its essentially pure form:

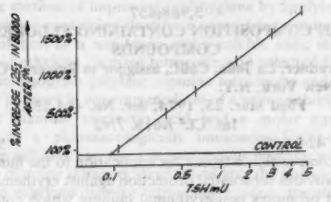
a. has the molecular formula $C_{34}H_{44}N_2SO_{18}$ (calculated on the basis of analysis);
b. has the following elemental analysis: C, 50.64, 51.34; H, 5.88, 6.00; N, 3.60, 3.65; S, 4.07, 4.06; O, 34.41;
c. has a specific rotation of $[\alpha]_D^{25} = +9.3°$ (c, 1, $CHCl_3$);
d. is soluble in chlorinated hydrocarbons, ethyl acetate, lower alcohols, pyridine and acetone;
e. has a characteristic UV spectrum as shown in FIG. 1 of the drawings;
f. has a characteristic infrared absorption spectrum when dissolved in a mineral oil mull as shown in FIG. 2 of the drawings;
g. has a characteristic and differentiating thin layer chromatography spectrum as shown in FIGS. 3 and 4 of the drawings; and
h. has a characteristic NMR spectrum as shown in FIG. 5 of the drawings, or inorganic cationic salts thereof.

3,988,442

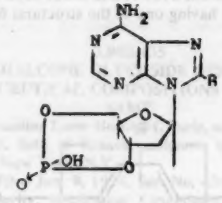
CYCLIC NUCLEOTIDE DERIVATIVES FOR TREATMENT OF HYPOTHYROIDISM

Georges D. Cehovic, Santa Ana, Calif., assignor to Nelson Research & Development Company, Irvine, Calif.

Filed July 16, 1975, Ser. No. 596,380
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 **1 Claim**



1. A method for stimulating the production of thyroid stimulating hormone in animals comprising administering to an animal an effective amount of a cyclic nucleotide derivative having the structural formula



wherein R is selected from the group consisting of amino, thiomethyl and azido and pharmaceutically acceptable salts thereof.

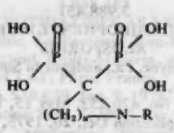
3,988,443

AZACYCLOALKANE-2,2-DIPHOSPHONIC ACIDS

Walter Ploger, Hilden Rhineland; Manfred Schmidt-Dunker, Dusseldorf, and Christian Gloxhuber, Haan Rhineland, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf, Germany

Division of Ser. No. 499,000, Aug. 20, 1974, Pat. No. 3,941,772. This application Oct. 2, 1975, Ser. No. 618,736
Claims priority, application Germany, Aug. 27, 1973, 2343196
Int. Cl.² A61K *31/675*
U.S. Cl. 424—200 **7 Claims**

1. A method for alleviating conditions caused by the abnormal deposition or dissolution of difficultly soluble calcium salts in the body of warm-blooded animals having said condition which consists of administering to said warm-blooded animals a safe but effective amount for said treatment of from 0.05 to 500 mg per kg of body weight of at least one pharmacologically acceptable azacycloalkane-2,2-diphosphonic compound selected from the group consisting of (A) a compound of the formula



wherein R is selected from the group consisting of hydrogen and alkyl having 1 to 3 carbon atoms, and *n* is an integer from 3 to 5; and (B) a non-toxic pharmacologically acceptable water-soluble salt thereof.

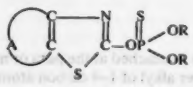
3,988,444

NOVEL THIAZOLE DERIVATIVES AS INSECTICIDES AND ACARICIDES

Jacques Perronnet, Paris, and Laurent Taliani, Les Pavillons-sous-Bois, both of France, assignors to Roussel-UCLAF, Paris, France

Division of Ser. No. 536,424, Dec. 26, 1974, Pat. No. 3,932,433. This application Oct. 30, 1975, Ser. No. 627,217
Claims priority, application France, Jan. 8, 1974, 74.00536
Int. Cl.² A01N *9/36*
U.S. Cl. 424—200 **10 Claims**

1. An insecticidal and acaricidal composition comprising an insecticidally and acaricidally effective amount of a compound of the formula



wherein A is polymethylene of 3 to 5 carbon atoms optionally substituted with a member of the group consisting of =O and

wherein R′ is alkyl of 1 to 5 carbon atoms and R is alkyl of 2 to 3 carbon atoms and an inert carrier.

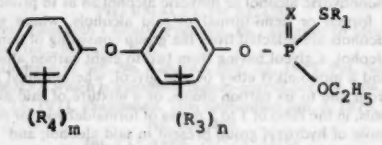
3,988,445

CONTROL OF INSECTS WITH O-(METHYL OR ETHYL)-O(S)-LOWER ALKOXYL-O-(4-PHENOXYPHENYL)-PHOSPHATES

Odd Kristiansen, Mohlin, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 466,923, May 6, 1974, Pat. No. 3,927,149. This application Sept. 15, 1975, Ser. No. 613,138
Claims priority, application Switzerland, May 11, 1973, 6721/73; Mar. 20, 1974, 3884/74
Int. Cl.² A01N *9/36*
U.S. Cl. 424—217 **15 Claims**

1. An insecticidal and acaricidal composition comprising (1) an insecticidally or acaricidally effective amount of a compound of the formula



in which R_1 is methyl, ethyl, n-propyl, isopropyl, n-butyl, sec. butyl, n-pentyl or n-pentyl; each of R_3 and R_4 is hydrogen, chlorine, bromine or nitro; each of *m* and *n* is 1 or 2; and X is oxygen or sulphur; and (2) a carrier.

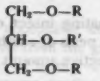
3,988,446

GLYCERIDES WITH ANTI-INFLAMMATORY PROPERTIES

Gerard Yvon Paris, Duvernay, and David Lyon Garmaise, Montreal, both of Canada, assignors to Abbott Laboratories, North Chicago, Ill.

Filed Nov. 7, 1974, Ser. No. 521,727
Int. Cl.² C07D *209/04, 207/24*; C11C *3/02*; C07C *69/52*
U.S. Cl. 424—230 **11 Claims**

1. A compound of the formula:



wherein R is an acyl derivative of the formula $CH_3—X—CO—$ wherein X represents a saturated or unsaturated, divalent carbon chain of 0 – 18 carbon atoms and wherein R′ is the acyl moiety of an pharmaceutically acceptable carboxylic acid, said acid having anti-inflammatory properties.

3,988,447

PHARMACEUTICAL PREPARATIONS

Vladimir Petrow, London, England, assignor to The British Drug Houses Ltd., London, England

Filed Oct. 15, 1963, Ser. No. 316,466
Int. Cl.² A61K *31/56*
U.S. Cl. 424—243 **8 Claims**

5. A method for the palliative treatment of endometrial carcinoma comprising orally administering to a human female afflicted with said endometrial carcinoma a daily dosage of from about 1.0 to about 100 mg of 17α-acetoxy-6-methyl-16-methylenepregna-4,6-diene-3,20-dione.

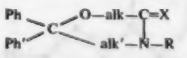
3,988,448

1,4-OXAZEPINES AS ANTIDEPRESSANT AGENTS

Robert Mathews Bowman, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,758
Int. Cl.² A61K *31/33*
U.S. Cl. 424—244 **4 Claims**

1. A pharmaceutical composition comprising an antidepressively effective amount of a compound of the formula



wherein X represents two hydrogen atoms or oxo, alk is methylidene, alk′ is ethylene, R is hydrogen, lower alkyl, lower alkenyl, lower alkynyl, (lower cycloalkyl, lower cycloalkenyl or Ph -$C_mH_{2(m-q)}$, (hydroxy, halogeno, amino, mono- or di-lower alkylamino)-C_pH_{2p}, or halogeno-C_pH_{2p-2}, each of Ph and Ph′ is phenyl, unsubstituted or substituted by up to three members of lower alkyl, lower alkoxy, lower alkylmercapto, hydroxy, halogeno or trifluoromethyl, *m* is an integer from 0 to 4, *p* such from 2 to 4, *q* such from 0 to 2 and (*m*—*q*) is positive; or a therapeutically acceptable acid addition salt thereof, together with a pharmaceutical excipient.

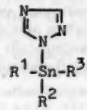
3,988,449

TRISALKYL TIN 1,2,4-TRIAZOLE INSECTICIDAL AND ACARICIDAL AGENTS

Karl Heinz Büchel, Wuppertal-Elberfeld, and Ingeborg Hammann, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 280,622, Aug. 14, 1972, Pat. No. 3,907,818. This application June 10, 1975, Ser. No. 585,644
Claims priority, application Germany, Aug. 28, 1971, 2143252
Int. Cl.² A01N 9/00
U.S. Cl. 424—245 9 Claims

1. A method of combating insect or acarid pests which comprises applying to the pests or a habitat thereof an insecticidally or acaricidally effective amount of a trisalkyl tin 1,2,4-triazole of the formula



(I)

in which

R^1, R^2 and R^3 each independently is alkyl or cycloalkyl of 3 to 6 carbon atoms,

alone or in admixture with a diluent or carrier.

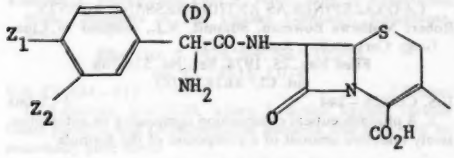
3,988,450

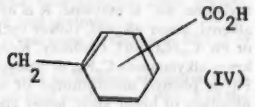
CEPHALOSPORINS

Brian George James, Cranleigh, England, assignor to Beecham Group Limited, Great Britain

Filed Mar. 27, 1975, Ser. No. 562,547
Claims priority, application United Kingdom, Apr. 10, 1974, 15805/74
Int. Cl.² C07D 501/24
U.S. Cl. 424—246 26 Claims

1. A cephalosporin analogue of the formula (IV):





(IV)

or a pharmaceutically acceptable salt thereof wherein Z_1 is hydrogen or hydroxyl and Z_2 is hydrogen or chlorine.

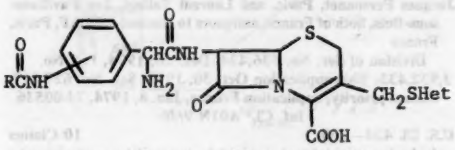
3,988,451

α-AMINO-α-(ACYLAMIDOPHENYL)ACETAMIDOCEPHALOSPORINS

George L. Dunn, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 470,233, May 15, 1974, Pat. No. 3,931,160. This application Oct. 20, 1975, Ser. No. 623,836
Int. Cl.² A61K 31/54
U.S. Cl. 424—246 25 Claims

18. A method of treating bacterial infections in a warm-blooded animal comprising administering to said animal an antibacterially effective but non-toxic dose of a compound of the formula



wherein:

the RCONH group is attached at the para or meta positions;

R is hydrogen, lower alkyl of 1–4 carbon atoms, or trifluoromethyl; and

Het is a 5 or 6 membered heterocyclic ring containing carbon and 1–4 atoms selected from the group consisting of N, O, and S, unsubstituted or substituted with one or two substituents selected from the group consisting of C_1–C_6 alkyl, C_1–C_6 alkoxy, allyoxy, oxide, carbamyl, carboxyl, carbalkoxy of C_1–C_6, halogen, mercapto, methylthio, trifluoromethyl, hydroxy, amino, alkylamino and dialkylamino, each undefined alkyl having 1–6 carbon atoms,

or a non-toxic pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier therefor.

3,988,452

PRESERVING AND DISINFECTING COMPOSITION

Heinz Eggensperger, Hamburg, and Karl-Heinz Diehl, Norderstedt, both of Germany, assignors to Sterling Drug Inc., New York, N.Y.

Filed Mar. 5, 1975, Ser. No. 555,441
Claims priority, application Germany, Mar. 6, 1974, 2410606
Int. Cl.² A61K 31/54
U.S. Cl. 424—246 7 Claims

1. A composition for controlling the growth and propagation of bacteria and fungi which comprises in combination:

a. a product obtained by reacting formaldehyde with a monohydric alcohol or dihydric alcohol so as to produce a formal or hemi-formal of said alcohols, where said alcohols are selected from the group consisting of benzyl alcohol, a glycol having from two to eight carbon atoms, and a mono-alkyl ether of said glycol, wherein alkyl has from one to six carbon atoms, or a mixture of said alcohols, in the ratio of 1 to 2 moles of formaldehyde for each mole of hydroxyl group present in said alcohol; and

b. a 3,5-bis(R-O-A)-tetrahydro-2H-thiadiazine-2-thione, wherein R is alkyl having from one to three carbon atoms, and A is alkylene having from two to six carbon atoms; the ratio of (a) to (b) being from about 1 : 99 to about 99 : 1.

3,988,453

NOVEL PHENOTHIAZINES AS NEUROLEPTICS

Pierre Henri Derible, Le Perreux; Jean-Paul Lavaux, Paris, and Jacques Laurent, Chilly-Mazarin, all of France, assignors to Roussel-UCLAF, Paris, France

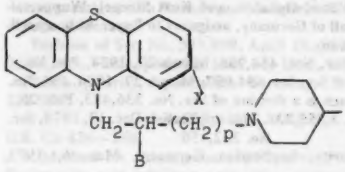
Division of Ser. No. 539,639, Jan. 9, 1975, Pat. No. 3,923,800. This application Sept. 9, 1975, Ser. No. 611,711

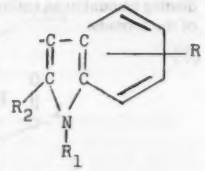
Claims priority, application France, Jan. 21, 1974, 74.01880

Int. Cl.² A61K *31/54*

U.S. Cl. 424—247 13 Claims

3. A method of inducing neuroleptic activity in warm-blooded animals comprising administering to warm-blooded animals a neuroleptically effective amount of an active compound selected from the group consisting of a compound of the formula





wherein X is selected from the group consisting of hydrogen, chlorine, trifluoromethyl, methylthio and methoxy, B is selected from the group consisting of hydrogen and alkyl of 1 to 3 carbon atoms, *p* is 0 or 1, R is selected from the group consisting of hydrogen and alkoxy of 1 to 3 carbon atoms and R_1 and R_2 are individually selected from the group consisting of hydrogen and alkyl of 1 to 3 carbon atoms and its non-toxic, pharmaceutically acceptable acid addition salt.

3,988,454

PHENYLALKYLARALKYLAMINES FOR PHARMACEUTICAL USE

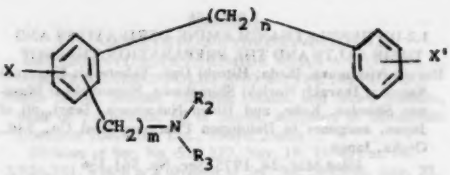
Marcia Elizabeth Christy, Perkasie, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 428,643, Dec. 27, 1973, Pat. No. 3,896,237, which is a continuation-in-part of Ser. No. 106,889, Jan. 15, 1971, abandoned. This application Jan. 3, 1975, Ser. No. 538,498

Int. Cl.² A61K *31/535, 31/54*

U.S. Cl. 424—248 2 Claims

1. A method for treating cardiac arrhythmia in animals which comprises administering to an afflicted animal an anti-arrhythmic dose of an active compound having the formula



or a pharmaceutically acceptable salt thereof, wherein

X and X' are selected from the group consisting of hydrogen, halogen, alkyl of from 1–6 carbon atoms, alkoxy of from 1–5 carbon atoms, perfluoroalkyl, alkylmercapto of from 1–6 carbon atoms, alkylsulfonyl of from 1–6 carbon atoms, and dialkylsulfamoyl of from 2–8 carbon atoms;

R_2 and R_3 are each $—CH_2—CH_2—$ and are taken together with said

atom through an atom of oxygen or sulfur to form the morpholinyl or thiomorpholinyl group;

m is an integer selected from the group consisting of 1–4 inclusive; and

n is an integer selected from the group consisting of 1–3 inclusive.

3,988,455

DITETRAZOLO(1,5-A:5',1'-C)QUINOXALINES FOR CONTROL OF SOIL-BORNE PHYTOPATHOGENS

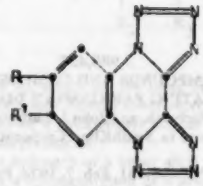
Barry A. Dreikorn, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed June 10, 1975, Ser. No. 585,550

Int. Cl.² A01N *9/00, 9/22*

U.S. Cl. 424—250 7 Claims

1. A method of reducing the adverse effects of soil-borne fungal phytopathogens which comprises contacting the phytopathogens with an effective phytopathogen-inhibiting amount of a compound of the formula



wherein R and R' independently represent hydrogen, trifluoromethyl, chloro or C_1–C_2 alkyl.

3,988,456

1,2-DIPHENYLETHANOLAMINE DERIVATIVES AND THEIR SALTS AND THE PREPARATION THEREOF

Haruki Nishimura, Ikeda; Hitoshi Uno, Takatsuki; Kagayaki Natsuka, Ibaraki; Noriaki Shimokawa, Nagaokakyo; Masanao Shimizu, Kobe, and Hideo Nakamura, Tenri, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan

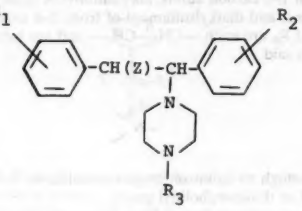
Filed Mar. 24, 1975, Ser. No. 561,336

Claims priority, application Japan, Mar. 29, 1974, 49-36537

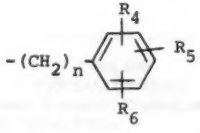
Int. Cl.[2] C07D *295/10*

U.S. Cl. 424—250 21 Claims

1. A 1,2-diphenylethanolamine derivative of the formula:



wherein R_1 and R_2 are each hydrogen, chlorine, nitro, hydroxy, methyl or methoxy; R_3 is a group of the formula:



wherein R_4, R_5 and R_6 are each hydrogen, chlorine or methoxy and *n* is an integer of 0, 1 or 2, or pyridyl; and Z is hydroxy or an alkanoyloxy selected from the group consisting of acetyloxy, propionyloxy, butyryloxy or isobutryloxy; with the proviso that when R_1 and/or R_2 are hydroxy, Z is hydroxy, or a pharmaceutically acceptable acid addition salt thereof.

3,988,457

NOVEL COMPOUNDS AND COMPOSITIONS FOR TREATING PARKINSON'S DISEASE

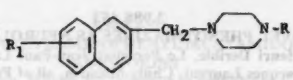
Harlan F. Hill, Narberth, and John J. Lafferty, Levittown, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 440,431, Feb. 7, 1974, Pat. No. 3,919,230. This application July 17, 1975, Ser. No. 596,872

Int. Cl.[2] A61K *31/495*

U.S. Cl. 424—250 9 Claims

1. A pharmaceutical composition in dosage unit form having anti-Parkinsonism activity comprising a pharmaceutical carrier and an effective amount of a compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof in which:

R is phenyl, pyridyl or pyrimidinyl; and

R_1 is hydrogen, lower alkyl, halogen, hydroxy or lower alkoxy having from 1 to 5 carbon atoms.

3,988,458

BICYCLIC DERIVATIVES OF 1,4-DIHYDROPYRIDINE 3,5-CARBOXYLIC ACID ESTERS

Horst Meyer, Wuppertal; Friedrich Bossert, Wuppertal-Elberfeld; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal-Vohwinkel, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

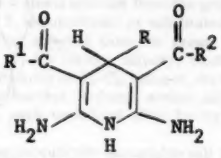
Division of Ser. Nos. 454,996, March 27, 1974, Pat. No. 3,950,336, and Ser. No. 454,997, March 27, 1974, Pat. No. 3,887,558, each is a division of Ser. No. 336,483, Feb. 28, 1973, Pat. No. 3,855,231. This application Dec. 13, 1974, Ser. No. 532,458

Claims priority, application Germany, Mar. 6, 1972, 2210633

Int. Cl.[2] A61K *31/505*

U.S. Cl. 424—251 9 Claims

1. An oral or parenteral pharmaceutical composition useful for effecting coronary vessel dilation and treating hypertension in humans and animals which comprises a coronary vessel dilating amount or an antihypertensive amount of a compound of the formula:



wherein

R is pyrimidyl, unsubstituted or substituted by one or two members selected from the group consisting of lower alkyl, lower alkoxy and halogeno provided only one tertiary group will be present when two substituents are on adjacent carbon atoms; and

each of R^1 and R^2, taken independently of the other, is lower alkoxy, lower alkoxy(lower alkoxy), alkenyloxy of 2 to 4 carbon atoms, alkynyloxy of 2 to 4 carbon atoms, amino, lower alkylamino or di(lower alkyl)amino,

in combination with a pharmaceutically acceptable non-toxic inert diluent or carrier.

3,988,459

NOVEL ANALGESIC COMPOSITIONS

Jean Meier, La Varenne Saint-Hilaire, France, assignor to Roussel-UCLAF, Paris, France

Filed May 6, 1975, Ser. No. 575,023

Claims priority, application France, May 9, 1974, 74.16018

Int. Cl.[2] A61K *31/47, 31/205*

U.S. Cl. 424—258 11 Claims

1. An oral analgesic composition comprising an effective amount of (A) 1 part by weight of a member of the group consisting of 4-[o-(2',3'-dihydroxypropyloxycarbonyl)-phenyl]-amino-8-trifluoro-methyl-quinoline and its non-toxic, pharmaceutically acceptable acid addition salts and (B) 0.5 to 2.5 parts by weight of a compatible therapeutically effective

salt of a strong acid and a member selected from the group consisting of amino acids and their betaines.

3,988,460

CYCLOPENTENOQUINOLONE COMPOUNDS FOR TREATING BACTERIAL INFECTIONS

Alfred Rhomberg, Mannheim-Neuostheim, Germany; Herbert Berger, Mannheim-Kafertal, Germany; Kurt Stach, deceased, late of Mannheim-Waldhof, Germany; by Werner Plattner, executor, Austria; Wolfgang Vomel, Mannheim, Germany, and Winfriede Sauer, Mannheim-Wallstadt, Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany

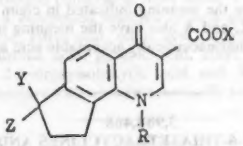
Division of Ser. No. 349,898, April 10, 1973, Pat. No. 3,901,895. This application Mar. 13, 1975, Ser. No. 558,101

Claims priority, application Germany, May 10, 1972, 2222833

Int. Cl.² A61K *31/47*

U.S. Cl. 424—258 **20 Claims**

1. Method for treating bacterial infection in a subject afflicted with said infection comprising administering to said subject a bacteriostatically effective amount of a cyclopentenoquinolone compound of the formula:



(I)

wherein

R is hydrogen, alkyl or alkenyl of up to six carbon atoms;

X is hydrogen, alkyl or alkenyl of up to six carbon atoms;

Y is hydroxyl, lower alkoxy or alkanoyloxy of up to six carbon atoms; and

Z is hydrogen or lower alkoxy of up to six carbon atoms; or

Z, together with Y, represents an oxo linkage; and the pharmacologically acceptable salts thereof.

3,988,461

PHARMACEUTICAL COMPOSITION FOR THE TREATMENT OF PARKINSON'S DISEASE

Ibolya Kosóczky; Zoltán Budai; László Kósa, and Lujza Petócz, all of Budapest, Hungary, assignors to Egyt Gyogyszervegyeszeti Gyar, Budapest, Hungary

Filed June 5, 1975, Ser. No. 583,904

Claims priority, application Hungary, June 13, 1974, EE 2244

Int. Cl.² A61K *31/195, 31/445*

U.S. Cl. 424—267 **1 Claim**

1. A pharmaceutical composition for the treatment of parkinsonism, containing 5-(1-methylpiperidylidene-4-5H-dibenzo(a,d)cycloheptene or a pharmaceutically acceptable salt thereof, and L-3,4-dihydroxyphenylalanine or a pharmaceutically acceptable salt thereof in a weight ratio of 0.5–5 : 50–150.

3,988,462

3-(5,7-DIMETHYL-2-HYDROXY-4-OXO-6,8-DECADIENYL)-GLUTARIMIDE AS AN ANTIVIRAL AGENT AGAINST POLIO AND A-TYPE INFLUENZA

Nakao Ishida, Sendai; Tsutomu Okada, and Akira Kamata, both of Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Division of Ser. No. 525,222, Nov. 19, 1974, Pat. No. 3,926,731, which is a division of Ser. No. 391,996, Aug. 27, 1973, Pat. No. 3,880,858. This application Aug. 25, 1975, Ser. No. 607,421

Claims priority, application Japan, Aug. 25, 1972, 47-85074

Int. Cl.² A61K *31/445*

U.S. Cl. 424—268 **1 Claim**

1. A method for alleviating the symptoms of A type influenza or polio in a mammalian host which comprises administering to said host an antivirally effective amount of 3-(5,7-dimethyl-2-hydroxy-4-oxo-6,8-decadienyl)-glutarimide.

3,988,463

METHOD OF PREVENTING METASTASIS OF H. EP. NO. 3

Charles O. Gitterman, Cranford, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 467,239, May 6, 1974, abandoned. This application July 31, 1975, Ser. No. 600,553

Int. Cl.² A61K *31/425*

U.S. Cl. 424—270 **1 Claim**

1. The method for inhibiting metastasis of the H. Ep. No. 3 carcinoma in ovo which comprises treating a H. Ep. No. 3 tumor-bearing embryonated chicken egg with 2,5-bis-(phenyl)-thiazolo[5,4-d]thiazole.

3,988,464

CYCLOPROPYLAMINES AS PHARMACEUTICALS

Charles Malen, Fresnes; Monique Desnos, Issy les Moulineaux; Michel Laubie, Vaucresson, and Jean-Claude Poignant, Bures S/Yvette, all of France, assignors to Science Union et Cie, Societe Francaise de Recherche Medical, Suresnes, France

Filed Dec. 26, 1973, Ser. No. 427,999

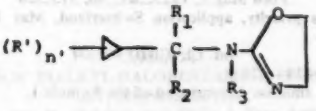
Claims priority, application United Kingdom, Dec. 28, 1972, 59886/72

Int. Cl.² A01N *9/22, 9/28*

U.S. Cl. 424—272 **10 Claims**

1. A pharmaceutical composition containing as active ingredient an amount effective to lower blood pressure of a compound selected from the group consisting of:

a. cyclopropylmethylamine of the formula



wherein R_1 and R_2, which are the same or different, each represent a hydrogen atom, a lower alkyl radical, a cyclopropyl radical or a cyclopropyl radical bearing one or more lower alkyl radicals,

R′ represents hydrogen or a lower alkyl radical,

R_3 represents a hydrogen atom or a lower alkyl radical, and

n' represents 0, 1, 2 or 3, and

b. physiologically acceptable acid addition salts thereof of a mineral or organic acid, in admixture with a pharmaceutically acceptable non-toxic inert carrier suitable for oral, parenteral, sublingual, or rectal administration.

3,988,465

BENZIMIDAZOLE INSECTICIDES

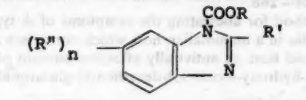
Hans F. W. Röchling; Karl-Heinz Büchel, and Friedrich W.A.G.K. Korte, all of Hangelar, Germany, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 542,204, April 13, 1966, Pat. No. 3,884,933. This application Nov. 14, 1974, Ser. No. 523,956

Int. Cl.[2] A01N *9/22*

U.S. Cl. 424—273 5 Claims

1. A method for controlling insects comprising subjecting insects to an insecticidally effective amount of a benzimidazole of the formula



wherein R is alkyl, alkenyl, cycloalkyl, aryl, aralkyl or alkaryl of up to 8 carbon atoms, R′ is perhaloalkyl of 1–4 carbon atoms, R″ is chlorine or bromine and *n* is a whole number of 2 to 4.

3,988,466

PREVENTION OF GASTRIC LESIONS

Keijiro Takagi, Tokyo, and Susumu Okabe, Chiba, both of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Division of Ser. No. 474,137, May 28, 1974, abandoned. This application Mar. 6, 1975, Ser. No. 555,718

Claims priority, application Japan, June 1, 1973, 48-61487; Dec. 17, 1973, 48-139577; Dec. 17, 1973, 48-139578

Int. Cl.[2] A61K *31/40, 31/195*

U.S. Cl. 424—274 6 Claims

1. An anti-inflammatory composition which comprises in single oral dose form from 25 mg to 50 mg of indomethacin and from 1g to 10g of at least one amino acid selected from the group consisting of L-lysine, L-arginine, L-histidine, L-serine, L-valine, L-threonine, glycine, L-alanine, L-glutamine, D-glutamine, L-leucine, L-isoleucine, L-glutamic acid, L-asparagine, L-proline, L-hydroxyproline, L-methionine, L-phenylalanine, DL-tryptophan, or a pharmaceutically acceptable non-toxic salt thereof.

3,988,467

AMINOACYL COMPOUNDS

Günther Dörhöfer, Allschwil; Roland Heckendorn, Arlesheim; Erich Schmid, Basel; Angelo Storni, Rheinfelden, and Armin Züst, Birsfelden, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

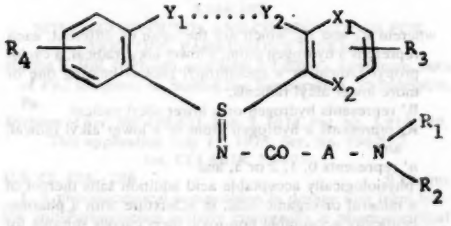
Filed May 7, 1975, Ser. No. 575,320

Claims priority, application Switzerland, May 10, 1974, 6422/74

Int. Cl.[2] C07D *495/04*

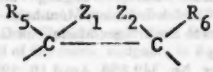
U.S. Cl. 424—274 14 Claims

1. An aminoacyl compound of the formula I,



(I)

in which R_1 and R_2 denote hydrogen or lower alkyl groups or, conjointly with the adjacent N atom, denote an alkyleneimino group with 5 to 7 ring members, or a 1-piperazinyl or hexahydro-1H-1,4-diazepin-1-yl group, which is optionally substituted in the 4-position by a lower alkyl group or a lower hydroxyalkyl group, R_3 denotes hydrogen, halogen up to atomic number 35 or a lower alkyl or lower alkoxy group, R_4 denotes hydrogen, halogen up to atomic number 35 or a lower alkyl, lower alkoxy, trifluoromethyl or nitro group, A denotes a divalent, saturated aliphatic hydrocarbon radical with 1 to 3 carbon atoms and one of the symbols X_1 and X_2 denotes a direct bond and the other denotes the vinylene group —CH=CH— or the epithio radical —S— and Y_1 and Y_2 conjointly denote a divalent bridge member Y_3 of the following structure:



wherein R_5 and R_6 denote hydrogen or lower alkyl groups and Z_1 and Z_2 each denote hydrogen or conjointly denote an additional bond, or R_5 and Z_1 denote hydrogen and, at the same time, R_6 and Z_2 conjointly denote an oxo radical, or a pharmaceutically acceptable acid addition salt thereof.

13. A method for the treatment of states of depression in a warm-blooded animal comprising administration to said animal of a therapeutically effective amount of a compound according to claim 1 having the formula I given in claim 1, in which Y_1 and Y_2 conjointly represent a bridge member Y_3 of the structure indicated in claim 1, in which R_5 and R_6 as well as Z_1 and Z_2 have the meaning indicated in claim 1, and X_1, X_2, R_1, R_2, R_3, R_4 and A also have the meaning indicated in claim 1, or of a pharmaceutically acceptable acid addition salt thereof.

3,988,468

7-METHOXY-6-THIATETRACYCLINES AND THEIR PREPARATION

Werner Rogalski; Richard Kirchlechner; Juergen Seubert; Rudolf Gottschlich, all of Darmstadt; Walter Hameister, Brauweiler; Rolf Bergmann, and Helmut Wahlig, both of Darmstadt, all of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

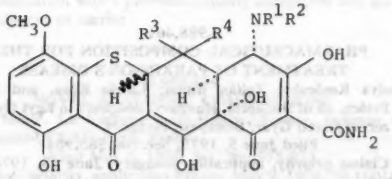
Filed July 30, 1975, Ser. No. 600,377

Claims priority, application Germany, Aug. 3, 1974, 2437487

Int. Cl.[2] C07D *335/04*

U.S. Cl. 424—275 19 Claims

1. A 7-methoxy-6-thiatetracycline of the formula



wherein R^1, R^2, R^3 and R^4 each are H or alkyl of 1 to 4 carbon atoms, and the physiologically acceptable acid addition salts thereof.

3,988,469

METHOD OF LOWERING PLASMA URIC ACID LEVELS

Thomas James Sullivan, Thrussington, and Patrick John Kingsley, Loughborough, both of England, assignors to Fisons Limited, Ipswich, England

Filed July 1, 1975, Ser. No. 592,208

Claims priority, application United Kingdom, July 4, 1974, 29602/74

Int. Cl.² A61K *31/35*

U.S. Cl. 424—283 10 Claims

1. A method for the treatment of hyperuricaemia or gout, which comprises administering an effective quantity of 6,8-di-t-butyl-4-oxo-4H-1-benzopyran-2-carboxylic acid, or a pharmaceutically acceptable salt thereof, as active ingredients, to a mammal having hyperuricaemia or gout.

3,988,470

TREATMENT OF PALMAR AND PLANT DISTURBED KERATOSIS

Eugene J. Van Scott, 1138 Sewell Lane, Rydal, Pa. 19046, and Ruey J. Yu, 4400 Dexter St., Philadelphia, Pa. 19128

Division of Ser. No. 445,231, Feb. 25, 1974, Pat. No. 3,920,835, which is a continuation-in-part of Ser. No. 394,269, Sept. 4, 1973, Pat. No. 3,879,537. This application Mar. 7, 1975, Ser. No. 556,423

Int. Cl.² A61K *31/35*

U.S. Cl. 424—283 10 Claims

1. A method of alleviating the symptoms of palmar keratosis comprising topically applying an effective amount of a medicinal composition to the involved portions of the human body, said composition comprising from about 1 to about 20% by weight of a compound selected from a group consisting of glycolic acid, citric acid, malic acid, tartronic acid, tartaric acid, glucuronic acid, pyruvic acid, ethyl pyruvate, methyl pyruvate, 2-hydroxyisobutyric acid and 3-hydroxy butyric acid in admixture with a pharmaceutically acceptable carrier.

3,988,471

INSECT CONTROL EMPLOYING CERTAIN BENZOATES

Gustave K. Kohn, Berkeley, Calif., assignor to Chevron Research Company, San Francisco, Calif.

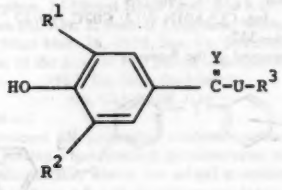
Continuation-in-part of Ser. No. 376,871, July 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 281,078, Aug. 8, 1972, Pat. No. 3,867,543. This application Mar. 19, 1975, Ser. No. 559,931

The portion of the term of this patent subsequent to Feb. 18, 1992, has been disclaimed.

Int. Cl.² A01N *9/12, 9/24*

U.S. Cl. 424—301 13 Claims

1. A method for killing mosquitos which comprises contacting pre-adult mosquitos with a metamorphosis inhibiting amount of a compound represented by the formula



wherein Y is sulfur or oxygen, U is sulfur or oxygen, R^1 and R^2 are branched alkyl groups of 3 to 6 carbon atoms attached to the aromatic ring through a secondary or tertiary carbon atom, R^3 is (1) alkyl of 1 to 6 carbon atoms, (2) cycloalkyl of 3 to 10 carbon atoms, (3) 2-alkenyl of 3 to 6 carbon atoms, (4) 2-alkynyl of 3 to 6 carbon atoms, (5) alkoxyalkyl of 2 to 6 carbon atoms, (6) alkylthioalkyl of 2 to 6 carbon atoms, (7) phenylalkyl of 7 to 10 carbon atoms, or (8) phenylalkyl of 7 to 10 carbon atoms and substituted on the phenyl ring with 1 to 2 substituents selectd from alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, fluorine, chlorine, or bromine.

3,988,472

TRI-N-PROPYLACETIC ACID DERIVATIVES FOR THERAPEUTIC USE

Charles Pigerol, St. Ouen, and Pierre Luc Eymard, Fontaine, both of France, assignors to Labaz, Paris, France

Continuation of Ser. No. 426,730, Dec. 13, 1973, abandoned. This application Nov. 10, 1975, Ser. No. 630,132

Claims priority, application France, Dec. 11, 1972, 72.43946

Int. Cl.² A61K *31/16*

U.S. Cl. 424—320 3 Claims

1. A method of inducing tranquillizing, disinhibiting and antidepressant effects in a subject needing such treatment, said method comprising administering a dosage ranging from 50 to 500 mgs. per day of tri-n-propylacetamide to said subject.

3,988,473

TERTIARY-ALKYLAMINO-LOWER ACYL-XYLIDIDE LOCAL ANAESTHETICS

Herbert J. F. Adams, Westboro, Mass.; Jon C. Anderson, Wyckoff, N.J.; Murray R. Blair, Jr., Sudbury, Mass.; Robert L. Di Rubio, Paxton, Mass., and Bertil H. Takman, Worcester, Mass., assignors to Astra Pharmaceutical Products, Inc., Worcester, Mass.

Division of Ser. No. 369,146, June 12, 1973, Pat. No. 3,925,469, which is a continuation-in-part of Ser. No. 325,378, Jan. 22, 1973, abandoned, which is a continuation-in-part of Ser. No. 230,114, Feb. 28, 1972, abandoned. This application Mar. 24, 1975, Ser. No. 561,604

Int. Cl.² A61K *31/165*

U.S. Cl. 424—324 10 Claims

6. A method of inducing local anesthesia comprising locally administering to an animal a locally anesthetizing amount of a compound selected from the group consisting of 2-(N-ethyl-tert.-amylamino)-2′,6′-acetoxylidide, 2-(N-n-propyl-tert.-amylamino)-2′,6′-acetoxylidide, 2(N-n-butyl-tert.-butylamino)-2′,6′-acetoxylidide, 2-(N-tert.-amylamino)-2′,6′-acetoxylidide and a pharmaceutically acceptable salt thereof.

3,988,474

N,N′-DIALKYL-HALOBENZAMIDINES AS ANTIDEPRESSANTS

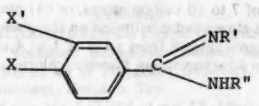
Abdulmuniem H. Abdallah, and Philip J. Shea, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 521,437, Nov. 6, 1974, abandoned. This application Sept. 23, 1975, Ser. No. 615,949

Int. Cl.² A61K *31/155*

U.S. Cl. 424—326 11 Claims

1. A method useful for alleviating symptoms of central nervous system depression in an animal comprising administering to an animal an amount of a compound selected from the group consisting of a substituted amidine and a pharmacologically-acceptable salt thereof effective to alleviate said symptoms, the substituted amidine corresponding to the formula:



wherein X represents chloro or bromo, X′ represents hydrogen or X, and R′ and R″ each independently represent methyl, ethyl or propyl.

3,988,475

PHENOXYALKYLAMINES

Elso Manghisi, Monza; Aldo Salimbeni, Milan, and Giancarlo Fregnan, Milan, all of Italy, assignors to Istituto Luso Farmaco d'Italia S.r.l., Milan, Italy

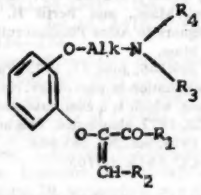
Filed Jan. 31, 1975, Ser. No. 545,946

Claims priority, application Italy, Feb. 5, 1974, 20199/74; Jan. 14, 1975, 19264/75

Int. Cl.[2] C07C *87/06;* A01N *9/20, 9/24*

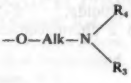
U.S. Cl. 424—330 13 Claims

1. A phenoxyalkylamine of the formula:



(I)

and its stereoisomers and optical isomers, and pharmaceutically acceptable acid addition salts, in which the



group may be in the ortho, meta or para position, R_1 is a linear or branched alkyl of 1 to 4 carbon atoms, or a monocarbocyclic aryl group, unsubstituted or substituted by one or more halogen atoms, or methyl or methoxy grups; R_2 is an alkyl of 1 to 4 carbon atoms or a monocarbocyclic aryl group unsubstituted or substituted by one or more halogen atoms, or alkyls of 1 to 4 carbon atoms, or methoxy groups; Alk is a linear or branched alkylene chain of 1 to 4 carbon atoms, or a hydroxy alkylene chain; and R_3 and R_4, which are the same or different, are each hydrogen, alkyl of 1 to 4 carbon atoms each, dialkylaminoalkyl of up to 4 carbon atoms in each alkyl, carbocyclic aryl, cycloalkyl of 3 to 8 carbon atoms, carbocyclic arylalkyl of 1 to 4 carbon atoms in the alkyl, or hydroxyalkyl of up to 4 carbon atoms in which the hydroxyl is separated from the nitrogen by at least two carbon atoms.

13. A pharmaceutical composition comprising as active principle one or more compounds as claimed in claim 1, in the form of free base or pharmaceutically acceptable salt, in association with a significant amount of pharmaceutically acceptable and compatible carrier.

3,988,476

PHARMACEUTICAL COMPOSITIONS AND METHODS OF TREATING ALLERGIC CONDITIONS UTILIZING 2-NITROINDANE-1,3-DIONE DERIVATIVES AS THE ACTIVE AGENT

Derek Richard Buckle, Redhill, and Harry Smith, Maplehurst, near Horsham, both of England, assignors to Beecham Group Limited, Great Britain

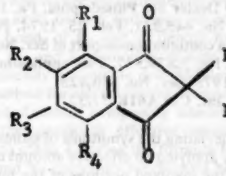
Division of Ser. No. 421,239, Dec. 3, 1973, Pat. No. 3,925,557, which is a division of Ser. No. 317,296, Dec. 21, 1972, Pat. No. 3,936,504. This application Feb. 14, 1975, Ser. No. 549,869

Claims priority, application United Kingdom, Jan. 25, 1972, 3348/72; Mar. 22, 1972, 13300/72; June 20, 1972, 28707/72; Oct. 18, 1972, 48027/72

Int. Cl.[2] A61K *31/12*

U.S. Cl. 424—331 34 Claims

1. A pharmaceutical composition in a form suitable for oral, parenteral or insufflation administration to warm-blooded mammals comprising an amount of a compound of the formula (I)



(I)

or a pharmaceutically acceptable nontoxic salt thereof, wherein

R_1, R_2, R_3 and R_4 are each hydrogen, lower alkoxy or lower alkyl, at least one of said R_1, R_2, R_3 and R_4 being lower alkoxy, sufficient to be effective for the prophylaxis of asthma, hay-fever, or rhinitis,

in combination with a pharmaceutically acceptable non-toxic inert diluent or carrier suitable for said administration form

8. A pharmaceutical composition according to claim 1 wherein the compound is 4-methoxy-2-nitro indane-1,3-dione.

3,988,477

ETHERS AND INSECTICIDAL COMPOSITIONS THEREWITH

Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

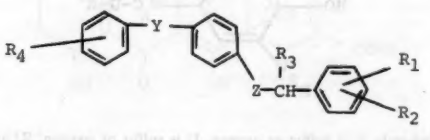
Filed Apr. 17, 1975, Ser. No. 569,039

Claims priority, application Switzerland, Apr. 18, 1974, 5362/74; Mar. 7, 1975, 2907/75

Int. Cl.[2] A01N *9/12;* C07C *149/32*

U.S. Cl. 424—337 17 Claims

1. A compound of the formula



wherein

Y represents —S—,

Z represents —O—,

R_1 represents hydrogen, C_1–C_4-alkyl, or halogen,

R_2 represents hydrogen, C_1–C_4-alkyl, or halogen,

R_3 represents hydrogen or methyl, and

R_4 represents hydrogen, methyl or halogen.

12. An insecticidal composition containing as active component an insecticidally effective amount of a compound according to claim 1, together with a suitable inert carrier therefor.

3,988,478

CARBON BLACK

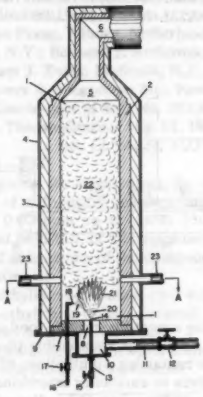
Louis E. Wiggins, West Monroe, La., assignor to Cities Service Company, Tulsa, Okla.

Continuation-in-part of Ser. No. 444,947, Feb. 22, 1974, abandoned, which is a continuation-in-part of Ser. No. 316,200, Dec. 18, 1972, Pat. No. 3,832,450. This application June 24, 1974, Ser. No. 482,128

The portion of the term of this patent subsequent to Aug. 27, 1991, has been disclaimed.

Int. Cl.² C09C 1/48

U.S. Cl. 423—445 8 Claims



1. A furnace carbon black having a particle size within the range of 15 to 60 millimicrons, a dibutylphthalate absorption (DBP) within the range of 60–120 c.c./100 gms., a nitrogen surface area within the range of 500 to 1000 $m^2/gm.$, and a volatile content of 1 to 3 weight percent.

3,988,479

GELLED PROTEINACEOUS FISH BAIT AND PROCESS OF PREPARING SAME

John T. Stephan, 13 Mount Hood Lane, and Kurt F. Stephan, 105 James St., Apt. 2, both of Longview, Wash. 98632

Filed Mar. 26, 1975, Ser. No. 562,266

The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.

Int. Cl.² A23K 1/18

U.S. Cl. 426—1 21 Claims

1. The process for preparing nonhomogeneous fish bait comprising mixing a gel-forming proteinaceous material and water at a temperature above the sol-gel transition temperature thereof to form a liquid proteinaceous mass;

forming said liquid proteinaceous mass into a fish bait shape;

cooling said shape to a temperature below the sol-gel transition temperature to form a gelled shape; and

tanning the surface of the gelled shape with a polymeric tanning agent consisting essentially of an aqueous solution of a condensation product of melamine with formaldehyde.

3,988,480

ACETIC ACID-PROTEIN COMPOSITIONS WITH DECREASED RUMEN DIGENTIBILITY

Stanley R. Ames, Rochester, N.Y., and Charles D. Robeson, Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,904

Int. Cl.² A23K 1/00

U.S. Cl. 426—2 7 Claims

1. A proteinaceous feedstuff for ruminants comprising the reaction product of a protein containing meal and from 8 to about 16%, based on the weight of the meal, of acetic acid, the meal thereby being rendered resistant to microbial breakdown in the rumen but not resistant to substantial digestive breakdown in the abomasum and intestines.

3,988,481

CHEESE MANUFACTURE FROM MOLECULAR SIEVED MILK

Samuel T. Coulter, Marine-on-St. Croix; Howard A. Morris, and Rulon A. Chappell, both of St. Paul, all of Minn., assignors to The Regents of the University of Minnesota, Minneapolis, Minn.

Filed July 2, 1970, Ser. No. 52,013

Int. Cl.² A23C 19/02

U.S. Cl. 426—40 10 Claims

1. A process for manufacturing a substantially sugar-free cheese food comprising the steps of:

A. standardizing fluid whole milk to secure the desired ratio of fat to other milk solids,

B. molecular sieving the resulting milk product to substantially separate and remove lactose and water soluble minerals from the milk to render the milk substantially sugar-free,

C. at least partially dewatering the resulting substantially sugar-free milk colloid to substantially the water content desired in the finished cheese food,

D. adding a curd-forming agent,

E. subjecting the resulting curd in the cheese-making mixture to conventional manipulation to promote proper curd formation, and without any substantial syneresis, and

F. molding the resulting cheese to form.

3,988,482

MENTHOL GLYCOSIDE, PROCESS FOR PREPARING THE SAME AND METHOD FOR RELEASING MENTHOL THEREFROM

Tatsuo Higashiyama, and Isao Sakata, both of Kasaoka, Japan, assignors to Toyo Hakka Kogyo Kabushiki Kaisha, Japan

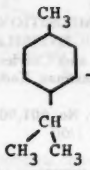
Division of Ser. No. 273,455, July 20, 1972, abandoned. This application Sept. 20, 1974, Ser. No. 507,964

Claims priority, application Japan, Aug. 27, 1971, 46-65616; Aug. 27, 1971, 46-65617

Int. Cl.² C12D 13/02; A23L 1/22, 1/08; A61K 7/16

U.S. Cl. 426—48 2 Claims

1. The method of manifesting upon oral or topical administration to a human being the inherent flavor and feeling of menthol in an aqueous base composition in which menthol is normally insoluble, which comprises the steps of providing in said composition a water-soluble menthol derivative having the formula:



wherein:

R is the residue of a mono- or oligosaccharide and *n* is the number of hydroxyl groups on said mono- or oligosaccharide and is at least 5, and orally or topically administering said composition to a human being, and effecting hydrolysis of said derivative in the administered composition by a carbohydrase enzyme or an acid harmless to human beings to thereby regenerate free menthol from said derivative and manifest said flavor and feeling.

3,988,483

LIQUID STARCH-UREA RUMINANT FEED AND METHOD OF PRODUCING SAME

Charles W. Deyoe, and Erle E. Bartley, both of Manhattan, Kans., assignors to The Kansas State University Research Foundation, Manhattan, Kans.

Filed Sept. 4, 1975, Ser. No. 610,160

Int. Cl.² A23K *1/00, 1/22*

U.S. Cl. 426—53 **45 Claims**

1. A method of preparing a highly nutritious liquid starch-NPN ruminant feed supplement comprising the steps of:

preparing an aqueous slurry comprising water and a solids fraction including a quantity of an edible, substantially ungelatinized starch-bearing feed material and an amount of a nonprotein nitrogeneous substance characterized by the property of being hydrolyzable to ammonia by rumen microorganisms which is thereafter convertible to microbial protein;

continuously directing a stream of said slurry through a cooking area presenting a zone of turbulence while simultaneously and continuously directing a stream of steam through said zone for directly and turbulently heating, disrupting and gelatinizing under pressures above atmospheric at least a fraction of the starchbearing food source in said slurry stream while the food source is in intimate contacting relationship with the nonprotein nitrogeneous substance present in the slurry stream, to thereby yield a reacted feed supplement product; and

continuously passing said feed product out of said cooking area.

3,988,484

PROCESS FOR PRODUCING TEXTURIZED DEHYDRATED POTATO RICE AND RELATED PRODUCTS

Mounir A. Shatila, 1375 York Drive, Blackfoot, Idaho 83221

Filed Apr. 21, 1975, Ser. No. 569,903

Int. Cl.² A23L *1/10*

U.S. Cl. 426—99 **16 Claims**

1. A process for the production of dehydrated instant texturized freeze-thaw stable potato product from a potato dough comprising the steps of:

a. producing a dough comprising water in the range of 64–78% by weight and 36–22% solids by weight, said solids comprising by weight raw starch in the range of 3–10%, binder in the range of 1–5%, 0 to 1.5 flavoring, and the balance comprising essentially cooked intact separated potato cells, said water having temperature high enough to promote swelling of said cells but being lower in temperature than the gelatinization temperature of said raw starch;

b. forming said dough into pieces in the range of ⅛ to 3/32 inch in cross section and from ¼ to 1½ inches in length;

c. predrying said formed pieces to a moisture content in the range of 30–60% by weight in the presence of air heated sufficiently to allow efficient drying but to avoid browning;

d. coating the surfaces of said predried pieces with edible fat or oil; and

e. drying said coated pieces at a product temperature above the gelatinization temperature of said starch to a moisture content of about 7 to 8% by weight thereby texturizing said surfaces and instantizing said coated pieces.

3,988,485

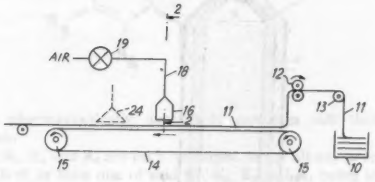
MEAT-LIKE PROTEIN FOOD AND METHOD OF MAKING

Harry Russell Hibbert, Dersingham, and John Edward Alexander Broadbent, King's Lynn, both of England, assignors to Mars Limited, Slough, England

Continuation-in-part of Ser. No. 470,924, May 17, 1974, abandoned. This application Nov. 18, 1974, Ser. No. 524,882

Int. Cl.² A23L *1/20;* A23J *3/00*

U.S. Cl. 426—104 **8 Claims**



1. A method of making a meat-like protein food comprising:

forming bundles of continuous spun edible proteinaceous fibres, each bundle containing a multiplicity of said fibres;

manipulating said fibres to enravel or intertwine them and thereby interlock said fibres in said bundles while leaving the bulk of the fibres substantially oriented in a gnerally parallel manner, said manipulation comprising agitating said fibres in said groups by turbulance created in a flow of fluid;

impregnating the fibre bundles with an edible binder;

assembling a plurality of said fibre bundles in side by side generally parallel arrangement;

and causing said binder to set and bond together said bundles into a chewable coherent mass in which said bundles retain their integrity and remain perceptible.

3,988,486

METHOD FOR ACCELERATING THE CRYSTALLIZATION AND REMOVAL OF TARTAR FROM A TARTAROUS BEVERAGE

Otto H. Rhein, Wiesbaden-Dotzheim, Germany, assignor to Henkell & Co., Wiesbaden-Biebrich, Germany

Filed Sept. 24, 1974, Ser. No. 508,740

Claims priority, application Germany, Sept. 28, 1973, 2348807; Aug. 12, 1974, 2438627; Aug. 8, 1974, 2438170; Aug. 12, 1974, 2438694

Int. Cl.² C12G *1/00;* C12H *1/06*

U.S. Cl. 426—495 **3 Claims**

1. A method for removing tartrate from a tartarous beverage comprising,

introducing said tartarous beverage under pressure into a module for reverse osmosis having a semipermeable membrane,

separating said tartarous beverage by reverse osmosis into a permeate portion of tartrate-free beverage and a con-

centrate portion containing a solution of said beverage and tartrate,
passing said permeate portion from said module to a recovery container,
withdrawing said concentrate portion from said module,
crystallizing tartrate crystals in said withdrawn concentrate portion,
filtering said tartrate crystals from said beverage in said concentrate portion, and
admixing said filtered beverage in said concentrate portion with said permeate portion in said recovery container to thus form a tartrate-free beverage.

3,988,487

FOODSTUFF FLAVORING COMPOSITIONS COMPRISING ALKYLIDENE ALKENALS AND PROCESSES FOR PREPARING SAME AS WELL AS FLAVORING COMPOSITIONS FOR USE IN SUCH FOODSTUFF

Anne Sanderson, Bricktown, N.J.; Gerard Mosciano, Newton, Pa.; Alan O. Pittet, Atlantic Highlands, N.J.; Louis J. Strasburger, Elizabeth, N.J.; William L. Schreiber, Jackson, N.J.; Michel Van Praag, Tilburg, Netherlands; Edward J. Shuster, Brooklyn, N.Y.; Bernard J. Rutkowsky, Jakarta, Indonesia, and William J. Evers, Redbank, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 383,658, July 30, 1973, abandoned. This application Aug. 12, 1975, Ser. No. 603,932

Int. Cl.² A23L *1/235*

U.S. Cl. 426—534 **5 Claims**

1. The process for augmenting the citrus or fresh green flavor note of a foodstuff which comprises adding thereto from about 0.02 ppm up to about 150 ppm, based on the weight of said foodstuff, of a composition of matter consisting essentially of at least one of the compounds selected from the group consisting of:
i. trans-2-ethylidene-6-methyl-cis-3-heptenal;
ii. trans-2-ethylidene-trans-3-hexenal;
iii. cis-2-ethylidene-cis-3-hexenal;
iv. cis-2-ethylidene-cis-3-hexenal diethylacetal; and
v. trans-2-ethylidene-cis-3-pentenal.

3,988,488

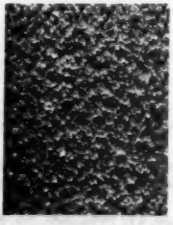
LEATHERLIKE FABRICS

Frank Peter Civardi, Wayne, N.J., assignor to Inmont Corporation, New York, N.Y.

Filed Jan. 22, 1975, Ser. No. 542,993

Int. Cl.² D06N *3/00;* **D03D** *27/00*

U.S. Cl. 428—89 **26 Claims**



1. A fabric of interlaced multi-fiber yarns having a nap of fibers extending therefrom, the fibers of said nap being bonded together, said bonded nap being severed, after bonding, along a multitude of short spaced lines to form spaced clumps of bonded fibers, said clumps having free ends and being brushable to and from stable upright positions, in which said free ends of the upright clumps project outwardly from the surrounding bonded nap and said fabric has a rough appearance, to bent-over positions in which said clumps merge with said surrounding bonded nap so that the fabric has a smoother appearance.

3,988,489

FIBER COATED THERMOPLASTIC

Philip D. George, and Robert J. Boudreau, both of Glens Falls, N.Y., assignors to General Electric Company, Hudson Falls, N.Y.

Continuation of Ser. No. 487,551, July 11, 1974, abandoned, which is a continuation of Ser. No. 327,510, Jan. 29, 1973, abandoned, which is a division of Ser. No. 287,751, Sept. 11, 1972, Pat. No. 3,772,578. This application Nov. 24, 1975, Ser. No. 634,425

Int. Cl.² B32B *7/00*

U.S. Cl. 428—216 **8 Claims**

1. As an article of manufacture, the combination comprising a thin thermoplastic sheet base member and a non self-supporting layer of small diameter elongated extruded fibers of a thermoplastic material adhering to said base, on at least one side thereof, said fibers having an average diameter less than about 0.3 μ and less than 2.5 cm in length, the said base member being less than about 15 μ in thickness and said layer being less than about 4 μ in thickness, said fibers constitute a thin layer whose porosity is greater than about 50% and said fibers are joined to said polypropylene base by a natural affinity bond.

3,988,490

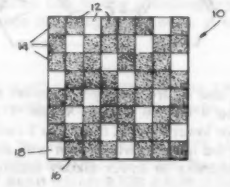
COVER CLOTH FABRIC

George C. Holroyd, and Dennis T. Austin, both of Hogansville, Ga., assignors to Uniroyal Inc., New York, N.Y.

Continuation of Ser. No. 454,494, March 25, 1974, Pat. No. 3,950,868, which is a continuation of Ser. No. 175,933, Aug. 30, 1971, abandoned. This application Nov. 17, 1975, Ser. No. 632,756

Int. Cl.² D06F *83/00*

U.S. Cl. 428—245 **10 Claims**



1. An improved fabric adapted to be manufactured into a cover cloth for use upon flatwork ironer rolls, comprising:
a plurality of staple fiber spun synthetic yarns each of which is uncoated,
selected from the group consisting of polyester and polyamide fibers
a plurality of glass yarns, each of said plurality of glass yarns being individually pre-coated with a resin,
said plurality of pre-coated glass yarns being interwoven with said uncoated synthetic yarns so that the major portion of the back surface of the fabric is formed of said pre-coated glass yarns and the major portion of the work engaging surface of the fabric is formed of said uncoated synthetic yarns to thereby impart a controlled smoothness to the work engaging surface thereof which does not impress its weave upon an article being ironed: and

a resin coating applied substantially uniformly on substantially the entire back surface of the woven fabric so as to improve the wear and distortion resistance of the fabric by locking said synthetic yarns and said glass yarns in place.

3,988,491

FLUORINATION OF POLYESTERS AND POLYAMIDE FIBERS

Dale D. Dixon, Kutztown, and Larry J. Hayes, Trexlertown, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 17, 1974, Ser. No. 434,285
Int. Cl.² D04H 1/58
U.S. Cl. 428—288 14 Claims

1. An oil stain release moisture transporting fiber form comprising a synthetic resin selected from the group consisting of polyamides and polyesters, said fiber form being surface fluorinated from about 4×10^{-6} to 1×10^{-2} mg F/cm² on an after wash basis, said fluorinated fiber form exhibiting a neutralization equivalent of below about 15,000 and said fluorinated fiber form having at least 90% of the tensile strength of untreated fiber form.

3,988,492

PRESSURE SENSITIVE COPY PAPER EMPLOYING PYRAZOLOXANTHENE COMPOUNDS

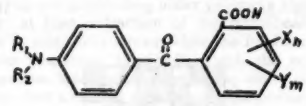
Sydney M. Spatz, Circleville, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Division of Ser. No. 461,860, April 18, 1974, Pat. No. 3,929,825. This application May 7, 1975, Ser. No. 575,476
Int. Cl.² B41M 5/14, 5/16, 5/18, 5/22
U.S. Cl. 428—323 2 Claims

1. A pressure sensitive copying paper comprising a paper having coated thereon microcapsules containing an organic solvent solution of a substantially colorless pyrazoloxanthene compound prepared by the process of

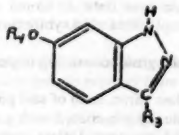
1. reacting about equimolar quantities of at least one member of (A) with (B) where

A. is a 2-(4′-N,N-substituted amino-2′-hydroxybenzoyl)-benzoic acid having the formula



wherein R_1 and R_2 are hydrogen or lower alkyl groups of from 1 to 4 carbon atoms, X and Y are hydrogen, halogen or lower alkyl of from 1 to 3 carbon atoms and n and m are integers whose sum is 4, and

B. is a 6-hydroxy or lower alkoxy indazole having the formula



wherein R_3 is hydrogen or methyl and R_4 is hydrogen, methyl or ethyl,

2. for a time period ranging from 1 to 24 hours,

3. at a temperature ranging from 110° to 35° C.

4. in sulfuric acid having a concentration above 70%, and thereafter recovering the reaction product,

said colorless pyrazoloxanthene compound in coming into contact with an electron acceptor forms a colored dye.

3,988,493

POLYMER POWDER COATING COMPOSITION

Michael Dimitri Yallourakis, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 23, 1975, Ser. No. 543,448
Int. Cl.² B32B 5/16, 15/08; C08F 14/06
U.S. Cl. 428—327 12 Claims

1. A powder coating composition consisting essentially of powder particles having diameters of less than 100 micron; wherein the powder particles consist essentially of a blend of:

A. 50–93% by weight of vinyl chloride/vinyl acetate/maleic anhydride (VC/VA/MA) polymer having a monomer weight ratio range for each monomer of VC 55–95 parts, VA 5–35 parts and MA .2–10 parts and having a number average molecular weight range of 20,000–50,000,

B. 5–30% by weight of plasticizer,

C. 1–10% by weight of liquid epoxy resin and,

D. 1–10% by weight of a mixture of mono-butyl tin mercaptide and di-butyl tin mercaptide.

9. A metal substrate coated with a coalesced layer of the powder coating composition of claim 1.

3,988,494

METALLIZING COATING COMPOSITIONS

Walter R. McAdow, Grosse Pointe Farms, Mich., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 242,797, April 10, 1972, which is a division of Ser. No. 47,881, June 19, 1970, Pat. No. 3,697,070, which is a continuation-in-part of Ser. No. 33,106, April 29, 1970, Pat. No. 3,692,731. This application Mar. 8, 1974, Ser. No. 449,413
Int. Cl.² B32B 5/16, 15/02
U.S. Cl. 428—328 13 Claims

1. A coated substrate comprising a base coated with a continuous film having resin-supported planar metal flakes dispersed therein, said flakes having a planar dimension in excess of 30 microns up to about 200 microns and providing less than 100 reflecting flakes per 5.5 square millimeters of surface area.

3,988,495

REMOISTENING ADHESIVE COMPOSITION AND ADHESIVE SHEET

James F. Lowey, Fremont, and Thomas V. Frommherz, Appleton, both of Wis., assignors to Central Paper Company, Menasha, Wis.

Filed Apr. 17, 1975, Ser. No. 568,979
Int. Cl.² C08L 3/12; C09J 7/02
U.S. Cl. 428—343 13 Claims

1. In a remoistening adhesive composition based on high amylopectin, low amylose starch, the improved combination with poly(vinyl methyl ether-maleic acid monoalkyl ester), in a minor amount effective to increase the initial tack and decrease the bonding time of the composition.

13. An adhesive tape which comprises a flexible elongated paper strip coated on one side thereof with a composition as defined in claim 1.

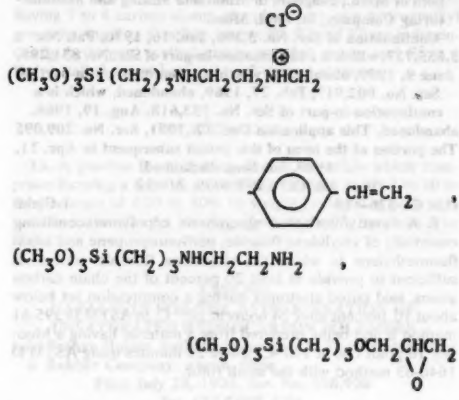
3,988,496

ETHYLENE-VINYL ACETATE-SILICONE RUBBER LAMINATES AND PREPARATION THEREOF

James W. Biggs, Lebanon, and Lawrence A. Meeks, Cincinnati, both of Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Sept. 12, 1975, Ser. No. 612,890
Int. Cl.² B05D 7/20; B32B 27/08
U.S. Cl. 428—383 20 Claims

10. A laminate comprising a crosslinked ethylene-vinyl acetate copolymer ply containing a silane selected from the group consisting of gamma methacryloxypropyl trimethoxysilane, vinyl triethoxysilane,



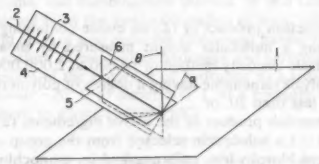
and $(CH_3O)_3Si(CH_2)_3Cl$ adhered to a ply of crosslinked silicone rubber.

3,988,497

PHOTOCATHODE MADE OF A SEMICONDUCTOR SINGLE CRYSTAL

Norio Asakura, Hamamatsu, Japan, assignor to Hamamatsu Terebi Kabushiki Kaisha, Japan

Filed Oct. 21, 1974, Ser. No. 516,474
Claims priority, application Japan, Oct. 25, 1973, 48-119448
Int. Cl.² B32B 3/10; H01J 39/00, 31/38
U.S. Cl. 428—409 2 Claims



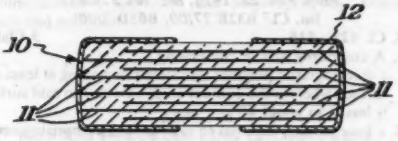
1. In a photocathode comprised of a single crystal of semiconductor and having an activated photoemissive surface for receiving in use light incident thereon to effect photoemission of electrons from the photoemissive surface; the improvement which comprises: means for rendering the sensitivity of said photoemissive surface to the light incident thereon substantially independent of polarization of the incident light and changes in the orientation of the polarized incident light relative to said photosensitive surface, said means comprising a rough surface portion of said photoemissive surface for receiving the light incident thereon and sufficiently rough so that the angle between the electric field vectors of the incident light and the rough portion of said photoemissive surface varies sufficiently between different points on the rough portion to render the sensitivity of said photocathode substantially independent of polarization of the incident light and changes in the orientation of the polarized incident light relative to the rough portion of said photoemissive surface.

3,988,498

LOW TEMPERATURE FIRED ELECTRICAL COMPONENTS AND METHOD OF MAKING SAME

Caleb H. Maher, Adams, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Continuation-in-part of Ser. No. 206,402, Dec. 9, 1971, Pat. No. 3,811,937. This application Apr. 4, 1974, Ser. No. 457,886
The portion of the term of this patent subsequent to May 21, 1991, has been disclaimed.
Disclosure was also published under second Trial Voluntary Protest Program on Jan. 13, 1976
Int. Cl.² B05D 5/12
U.S. Cl. 428—434 10 Claims



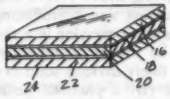
1. An electrical component comprising a low temperature fired ceramic body of a fired blend containing 70 to 92% by weight of a calcined high temperature ceramic mixture and 8–30% by weight of a low firing temperature glass formulation having a melting temperature less than 1,600°F, said calcined ceramic mixture containing from 0–30 mole percent baria, 45–95 mole percent titania and 5–50 mole percent of a rare earth oxide selected from the group consisting of neodymium, lanthanum and mixtures thereof, said glass formulation consisting in weight percent essentially of 5–30% of the glass former oxides selected from the group consisting of B_2O_3 and SiO_2, 0–5% Al_2O_3, 0–15% ZnO, 0–20% CdO, and at least 35% of an oxide selected from the group consisting of Bi_2O_3 and PbO; and at least one metallic film located within said ceramic body, said metallic film having a melting point not substantially greater than the firing temperature of said body.

3,988,499

STORAGE BAG AND METHOD FOR USING SAME

Thomas D. Reynolds, 441 Flynt Valley Drive, Winston-Salem, N.C. 27104

Division of Ser. No. 542,738, Jan. 20, 1975, abandoned. This application Sept. 8, 1975, Ser. No. 611,580
Int. Cl.² B65D 65/18; B32B 27/30, 27/32, 27/34
U.S. Cl. 428—474 1 Claim



1. A composite film comprising:

a. a first outer layer of transparent nylon film having a thickness between 0.75 mils. and 2 mils., a puncture resistance value of between 750 to 800 lb./in.², a tear resistance value between 0.75 to 0.85 lbs. and an oxygen transmission rate of less than 1cc/400 in.²/24 hours;

b. an intermediate layer of transparent low density polyethylene having a thickness between 0.5 mils. and 1.5 mils.;

c. said nylon layer and said polyethylene layer bonded to each other by an adhesion promoter to provide a bond strength in the range of 450 to 500 grams per inch of width, said adhesive promoter being a primer coating applied to said nylon film prior to bonding said nylon film to said polyethylene, and,

d. a second outer layer of heat sealable, ionomer film, bonded to said polyethylene layer, which is an ethylene-acrylic acid copolymer partially neutralized with sodium or zinc, said ionomer film having an external matte finished surface which is translucent, formed by contacting said ionomer film with a chill roll, said ionomer film having a heat sealing temperature of 200°–230° F. and a seal strength between 10 to 14 lbs./in. of width.

3,988,500
NON-BLOCKING, OXYGEN-RESISTANT VINYLIDENE CHLORIDE POLYMER COATINGS AND COMPOSITE ARTICLES PREPARED THEREFROM

Robert G. Jahn, Saginaw, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 22, 1974, Ser. No. 526,437
Int. Cl.² B32B *27/00;* **B05D** *7/00*
U.S. Cl. 428—518 **3 Claims**

1. A composite article comprising

1. a thermoplastic polymer film substrate having at least one surface wherein the contact angle of water to said surface is less than about 80°,

2. a base coating adhered to said surface comprising essentially a blend of about 60 parts by weight of an interpolymer of about 80 percent by weight vinylidene chloride, about 20 percent by weight methacrylonitrile and about 4 percent by weight acrylic acid; and about 40 parts by weight of an interpolymer of about 90 percent by weight vinylidene chloride, about 10 percent by weight butyl acrylate and about 5 percent by weight acrylic acid,

3. a top coating adhered to said base coating comprising essentially an interpolymer of about 92 percent by weight vinylidene chloride, abount 5.5 percent by weight acrylonitrile and about 2.5 percent by weight methylmethacrylate, and

4. a surfactant anti-block overcoating adhered to said top coating consisting essentially of the dried residue of an aqueous dispersion of water and from about 0.25 to about 1.0 percent based on dispersion weight of the sodium salt of lauryl alcohol sulfate.

3,988,501
THERMOSENSITIVE ELEMENT FOR THERMOGRAPHIC REPRODUCTION OR REGISTRATION SYSTEMS

Franco Knirsch, Pavone Canavese (Turin), and Dino Lavagna, Ivrea (Turin), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Continuation of Ser. No. 309,838, Nov. 27, 1972, abandoned. This application Aug. 22, 1974, Ser. No. 499,702
Int. Cl.² B32B *21/04, 23/04, 29/00*
U.S. Cl. 428—532 **3 Claims**

1. A temperature-responsive record material for use in a thermographic recording and reproducing apparatus, comprising a paper base sheet carrying in a single coating a composition, resulting by mixing together separately prepared dispersions of (A) finely divided solid crystal violet lactone and respectively of (B) a phenolic acidic compound in a binder, said binder comprising at least 5 part by weight of a non-ionic water soluble cellulose ether comprising hydroxypropylmethylcellulose which acts as a dispersing and binding agent, a lubricating agent and a pigment being incorporated respectively in said (A) and (B) dispersions and wherein said non-ionic cellulose ether is employed in a ratio of non-ionic cellulose ether to said binder which has a range from 5–95 to 100–0 parts b.w., the ratios of the components, based on the dry, being 3–8% of said crystal violet lactone, 8–12% of said lubricating agent, 40–60% of said pigment, 30–50% of said phenolic acidic compound, the ratio of said binder to the solids components having a range from 1 to 3 to 1 to 25.

3,988,502
CURED FLUORINATED ELASTOMER

Kalyanji U. Patel, St. Paul, and John E. Maier, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 3,396, Jan. 16, 1970, Pat. No. 3,655,727, which is a continuation-in-part of Ser. No. 831,295, June 9, 1969, abandoned, which is a continuation-in-part of Ser. No. 802,917, Feb. 27, 1969, abandoned, which is a continuation-in-part of Ser. No. 753,618, Aug. 19, 1968, abandoned. This application Dec. 17, 1971, Ser. No. 209,095 The portion of the term of this patent subsequent to Apr. 11, 1989, has been disclaimed.
Int. Cl.² C08F *8/00, 214/22*
U.S. Cl. 526—18 **1 Claim**

1. A cured fluorinated elastomeric copolymer consisting essentially of vinylidene fluoride, perfluoropropene and tetrafluoroethylene in which the vinylidene fluoride content is sufficient to provide at least 20 percent of the chain carbon atoms, said cured elastomer having a compression set below about 10 percent after 24 hours at 205° C. in ASTM D 395-61 method B and being prepared from a material having a Mooney 10 point rise at 120° C. above 25 minutes using ASTM D 1646-63 method with the small rotor.

3,988,503
TREATING AGENT USEFUL FOR FIBROUS MATERIALS AND PREPARATION THEREOF

Junji Ariyoshi, Hirakata; Akira Ohnishi, Ashiya; Hiromi Toda, Daito; Kametaro Kunimori, Neyagawa, and Mitsuyoshi Nakao, Kawachinagano, all of Japan, assignors to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 3, 1975, Ser. No. 555,039
Claims priority, application Japan, Mar. 5, 1974, 49-25991
Int. Cl.² C08F *8/08;* **C08J** *5/18;* **D06M** *15/12;* **D21H** *3/38*
U.S. Cl. 526—23 **19 Claims**

1. A treating agent useful for fibrous materials which comprises

A. a reaction product of (a) an amide-containing polymer having a molecular weight measured by means of an intrinsic viscosity method of 10,000 to 2,000,000 and (b) a polyalkyleneimine having a degree of polymerization of not less than 20, or

B. a reaction product of the above ingredients (a) and (b) and (c) a halohydrin selected from the group consisting of epichlorohydrin, epibromohydrin, monochlorohydrin, monobromohydrin, dichlorohydrin and dibromohydrin, said amide-containing polymer consisting essentially of 60 to 100% by mole of a component having the following structure:

wherein R^1 is hydrogen or methyl group and 0 to 40% by mole of a component having the following structure:

wherein R^2 is hydrogen or methyl group and X is a member selected from the group consisting of —$COOR^3$, -CN,

—$OCOR^6$ and —$CONHR^7$ and wherein R^3 is an alkyl group having 1 to 8 carbon atoms, glycidyl group or a hydroxyalkyl group having 2 to 4 carbon atoms, R^4, R^5 and R^6 are independently hydrogen, methyl group or ethyl group and R^7 is a hydroxyalkyl group having 1 to 2 carbon atoms or

13. A process for preparing fibrous materials which comprises forming a sheet in an aqueous medium at pH 3 to 10 in the presence of 0.05 to 10% by weight (calculated as a non-volatile material) of a treating agent according to claim 1 to fiber.

3,988,504

CATALYSTS FOR THE HYDROGENATION OF UNSATURATED HYDROCARBON POLYMERS

Adel Farhan Halasa, Bath, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed July 24, 1975, Ser. No. 598,920

Int. Cl.² C08F *8/04*

U.S. Cl. 526—25 **17 Claims**

1. A process for the hydrogenation of unsaturated hydrocarbon polymers comprising, treating the polymers with a catalyst, said catalyst formed by the reaction of a ligand metallic salt and a reducing compound selected from the group consisting of trialkyl aluminum and dialkyl aluminum hydride, said ligand metallic salt having the formula:

where R is an aliphatic having from 1 to about 20 carbon atoms, a cycloaliphatic having from about 4 to about 20 carbon atoms, an aromatic having from about 6 to about 20 carbon atoms, and combinations thereof, M is a Group VIII metal selected from the group consisting of iron, cobalt, and nickel, said alkyl of said reducing compound having from 1 to about 20 carbon atoms, adding hydrogen and carrying out the hydrogenation in the presence of hydrogen at a temperature of from about −20° C to about 500° C at a pressure of about 1 atmosphere to about 15,000 PSIG.

3,988,505

POLYMERIZATION PROCESS

Dennis Ernest Mackley Evans, Welwyn Garden City, and Brian Norman Hendy, Welwyn, both of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 354,124, April 24, 1973, abandoned. This application Feb. 20, 1975, Ser. No. 551,502

Claims priority, application United Kingdom, May 5, 1972, 21085/72

Int. Cl.² C08F *2/24*, *14/06*, *14/08*

U.S. Cl. 526—59 **5 Claims**

1. A method for controlling polymer particle size in a free radical catalyzed emulsion polymerization of at least one ethylenically unsaturated monomer in which at least one emulsifer is added to the polymerization as the polymerization proceeds, said method including the step of continuously measuring the heat evolved in the polymerization reaction so as to follow the conversion of monomer to polymer and adding said emulsifier to the polymerization at a rate determined by the measured rate at which heat is evolved such that the total amount of emulsifier fed to the reaction mixture up to any one time is related to the total amount of heat evolved up to that time, said ethylenically unsaturated monomer being selected from the group consisting of styrene, α-methylstyrene, o-methylstyrene, m-methylstyrene, p-methylstyrene, 2,5-dimethylstyrene, p-methoxystyrene, p-dimethylaminostyrene, p-acetamidostyrene, m-vinylphenol, p-trimethylsilystyrene, ar-debromostyrene, 1-vinylnaphthalene, acenaphthylene, 3-vinylphenanthrene, 2-vinylthiophene, indene, courmarone, N-vinylcarbazole, vinyl pyridine, vinyl acetate, butadiene, isoprene, ethylene, propylene, isobutene, 4-methylpentene-1, vinyl chloride, vinylidene chloride, vinyl fluoride, vinylidene fluoride, hexafluoropropene, chlorotrifluoro-ethylene, acrolein, methacrolein, acrylonitrile, methacrylonitrile, α-acetoxyacrylonitrile, acrylic acid, methacrylic acid, and esters of said acids, cinnamonitrile, chloroacrylonitrile fumaronitrile, maleonitrile, maleic anhydride, moleimide, N-arylomadeimides, alkylvinyl and alkylisopropenyl ketones, ethers and sulfones.

3,988,506

PROCESS FOR PRODUCING CHLOROPRENE ELASTOMER

Michio Dohi; Takuji Sumida, and Katsuichi Yokobori, all of Niigata, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 2, 1975, Ser. No. 574,160

Claims priority, application Japan, May 2, 1974, 49-48766

Int. Cl.² C08F *236/04*

U.S. Cl. 526—218 **11 Claims**

1. A process for producing a chloroprene elastomer having excellent heat aging resistance, which comprises copolymerizing in the presence of a radical catalyst a mixture consisting of 80 to 95 parts by weight of 2-chlorobutadiene-1,3 containing less than 0.95% by weight of 1-chlorobutadiene-1,3 with 5 to 20 parts by weight of 2,3-dichlorobutadiene-1,3 at a polymerization temperature of not higher than 20° C in the presence of a mercaptan compound.

3,988,507

ANAEROBICALLY HARDENING ADHESIVES AND SEALANTS CONTAINING A HYDRAZONE ACCELERATOR

Werner Gruber, Dusseldorf-Gerresheim; Joachim Galinke, Dusseldorf-Holthausen, and Jürgen Keil, Monheim-Hitdorf, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Aug. 25, 1975, Ser. No. 607,465

Claims priority, application Germany, Sept. 2, 1974, 2442000

Int. Cl.² C08F *120/10*

U.S. Cl. 526—328 **16 Claims**

1. In an aerostable, anaerobically setting adhesive composition comprising a polymerizable (meth) acrylate ester as principal latent adhesive component, and an effective amount, in the range of 0.1% to 20% by weight of a hydroperoxide polymerization catalyst therefor, said hydroperoxide being derived from a hydrocarbon carrying a C_5–C_{18} chain: a small but effective uniformly distributed amount of an organic hydrazone in the range of 0.01% to 10% based on the weight of said ester as accelerator for said catalyst.

3,988,508

HIGH INTERNAL PHASE RATIO EMULSION POLYMERS

Kenneth J. Lissant, St. Louis, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Mar. 8, 1973, Ser. No. 339,203
Int. Cl.² C08F 2/30, 14/06, 12/08
U.S. Cl. 526—344 14 Claims

1. A process of emulsion polymerization which comprises forming a high internal phase ratio monomer-in-water emulsion of (1) an emulsion polymerizable monomer containing at least one $CH_2=C<$ group or an emulsion polymerizable mixture of monomers containing at least one $CH_2=C<$ group, (2) an emulsifying agent capable of forming a high internal phase ratio emulsion and (3) water, said monomer or said mixture of monomers being present in said high internal phase ratio monomer-in-water emulsion in an amount of at least 70% by volume of said emulsion, and treating said high internal phase ratio monomer-in-water emulsion under polymerization conditions so as to form the polymer, wherein said emulsifying agent is an oxyalkylated surfactant or a mixture of oxyalkylated surfactants.

3,988,509

REDUCED MELT INDEX, LOW GEL CONTENT ETHYLENE COPOLYMERS AND PROCESS FOR PREPARATION THEREOF

Edward Cooper Ballard, and John Ricks Priest, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 349,484, April 9, 1973, Pat. No. 3,884,857, which is a continuation-in-part of Ser. No. 143,311, May 14, 1971, abandoned. This application Apr. 10, 1975, Ser. No. 567,017
Int. Cl.² C08F 220/12
U.S. Cl. 528—491 14 Claims

1. In a continuous, high-pressure, free radical polymerization process for preparing ethylene copolymers having reduced gel content and melt index comprising

a. introducing ethylene and at least one monomer selected from the group consisting of vinyl esters of C_1 to C_4 monobasic aliphatic acids, acrylates and methacrylates wherein the alcohol moiety is derived from aliphatic C_1 to C_4 monohydroxy alcohols, acrylic acid, methacrylic acid, maleic acid, and maleic anhydride, provided that at least 75 mol % of the monomers is ethylene and sufficient amount of said vinyl ester, acrylate or methacrylate monomer is introduced to yield at least about 5 weight % of units derived from said monomer in the resulting copolymer, and an initiator into the reactor,

b. maintaining said monomers and initiator in contact in said reactor at a temperature of about 100° C.–250° C. and a pressure of about 1000–2500 atmospheres until the desired extent of conversion to ethylene copolymers has been obtained,

c. removing the reaction mixture from said reactor,

d. reducing the pressure by first pressure let-down means such that the reaction mixture enters a first separator at about 100–400 atmospheres,

e. separating out from said reaction mixture in said first separator about 90–97% of the unreacted monomers,

f. further reducing the pressure by second pressure let-down means such that the reaction mixture enters a second separator at about 0–5 atmospheres above ambient, and

g. separating out from said reaction mixture in said second separator substantially all of the remaining about 3–10% by weight of unreacted monomers,

the improvement in said process comprising the in-line addition of a solution of a free radical initiator in a suitable solvent which is soluble in the copolymer and is not harmful to the crosslinking reaction to said ethylene copolymer reaction mixture after the pressure has been reduced to below about 250 atmospheres and after at least about 90% by weight, but not more than about 97% by weight, of the unreacted monomers have been separated out from said reaction mixture, thereby producing an at least about 50% reduction in the melt index of said ethylene copolymer.

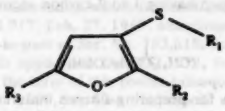
3,988,510

3-FURYL SULFIDES AND FOODSTUFF FLAVOR COMPOSITIONS COMPRISING SAME

William J. Evers, Middletown; Howard H. Heinsohn, Jr., Hazlet; Manfred Hugo Vock, Locust, and Christopher Giacino, Califon, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed May 29, 1975, Ser. No. 581,962
Int. Cl.² A23L 1/231
U.S. Cl. 426—535 9 Claims

1. A 3-furyl sulfide having the structure:



wherein R_1 is selected from the group consisting of 3,6-dimethyl-2-pyrazinyl and 3-isobutyl-2-pyrazinyl; and R_2 and R_3 are each selected from the group consisting of methyl and hydrogen, at least one of R_2 and R_3 being methyl.

4. The process for augmenting the meaty flavor of a foodstuff comprising the step of adding to said foodstuff from about 0.0001 parts per million up to about 250 parts per million of the compound of claim 1.

3,988,511

PREPARATION OF WATER DISPERSIBLE PROTEIN PRODUCTS

Abraham Schapiro, P.O. Box 548, Kentfield, Calif. 94904

Continuation-in-part of Ser. No. 889,703, Dec. 31, 1969, abandoned, and Ser. No. 89,052, Nov. 12, 1970, abandoned, and Ser. No. 156,040, June 23, 1971, abandoned, and Ser. No. 359,727, May 14, 1973. This application Jan. 2, 1974, Ser. No. 430,230
Int. Cl.² A23C 23/00; A23J 1/20, 3/00, 7/00
U.S. Cl. 426—580 5 Claims

1. A dry method of converting a water insoluble protein to an end product which is in a readily water dispersible form, said protein being selected from the class consisting of seed meal proteins, casein and caseinates, said method comprising the following steps:

a. providing a dry substrate selected from said class of proteins and water-soluble carbohydrate sweetening agents and which is a small fraction of the weight of the end product

b. intimately mixing a surfactant which is acceptable as a food ingredient with such substrate to provide a uniform blend of the substrate and surfactant

c. then adding to and intimately mixing with the blend resulting from step (b) an increment of the aforesaid protein which is a small fraction of the weight of the end product, thereby providing a uniform blend of the added protein, the substrate and the surfactant and

d. continuing addition of the selected protein in increments each of which is a minor fraction of the total weight of the end product, and thoroughly and intimately mixing each added increment with the material to which it is added before adding the next increment,

e. such addition of increments continuing until an end product results which contains not less than 90% of the selected protein and less than 1% of the surfactant

the amount of surfactant being sufficient to render the end product dispersible by hand stirring in an aqueous medium at room temperature to provide a stable dispersion.

3,988,512

CLOUDING CONTROL AGENT FOR BEVERAGES

Lawrence A. Johnson, Medina, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed Apr. 17, 1975, Ser. No. 569,010
Int. Cl.² B01F 17/30
U.S. Cl. 426—590 7 Claims

1. In an aqueous beverage containing by weight between about 0.05% to 3% essential oils wherein the improvement comprises:

the inclusion of ethoxylated monoglyceride wherein the weight ratio of ethoxylated monoglyceride to said essential oil is between about 0.01 to 2.0.

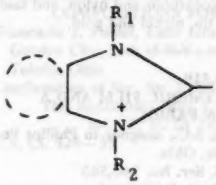
3,988,513

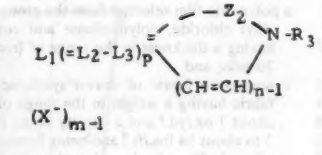
SILVER HALIDE EMULSIONS FOR RECORDING ELECTRON RAYS

Junichi Matsuyama; Akira Sato; Yosuke Nakajima, and Yoshiyuki Nakazawa, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Division of Ser. No. 324,273, Jan. 17, 1973, which is a continuation-in-part of Ser. No. 160,181, July 6, 1971, abandoned. This application Mar. 20, 1975, Ser. No. 560,053
Claims priority, application Japan, July 6, 1970, 45-58880
Int. Cl.² B05D 3/06
U.S. Cl. 427—43 6 Claims

1. A process for recording electron rays which comprises imagewise exposing to electron ray radiation a silver halide emulsion coated on a base and containing silver halide grains having an average particle size of less than 0.2 microns and at least one sensitizing dye represented by the following formula:





wherein Z_1 represents a group of atoms necessary to form a benzene ring or naphthalene ring, Z_2 represents a group of atoms necessary to form a 5-member or 6-member heterocyclic nucleus of the type conventionally used in sensitizing cyanine dyes and which does not deteriorate the sensitivity to electron rays of said sensitizing dye, said five-member or six-member heterocyclic nucleus being selected from the group consisting of a thiazoline nucleus, an oxazoline nucleus, a thiazole nucleus, an oxazole nucleus, a benzothiazole nucleus, a naphthothiazole nucleus, a benzoxazole nucleus, a naphthoxazole nucleus, a benzoselenazole nucleus, a naphthoselenazole nucleus, an indolenine nucleus, a benzoindolenine nucleus, an imidazole nucleus, a benzoimidazole nucleus, a naphthoimidazole nucleus, a 2-quinoline nucleus, a 2-benzoquinoline nucleus, a 4-quinoline nucleus, a 4-benzoquinoline nucleus, a 2-pyridine nucleus, and a 4-pyridine nucleus, R_1, R_2 and R_3 each represents an alkyl group, or an aryl group, L_1, L_2 and L_3 each represents a methine group, said R_1 and L_1, R_2 and L_1 or R_3 and L_3 may be linked by an alkylene group, m and n each represents 1 or 2, X represents an acid anion, and p represents 1 or 2.

3,988,514

CATALYTIC MATERIAL

Patrick John Denny, and Donald Anderson Crooks, both of Stockton-on-Tees, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 193,692, Oct. 29, 1971, abandoned. This application Nov. 21, 1973, Ser. No. 417,935
Claims priority, application United Kingdom, Nov. 13, 1970, 54128/70
Int. Cl.² B05D 7/22, 3/02
U.S. Cl. 427—239 9 Claims

1. In a method for making an oven surface comprising a substrate and a catalytic coating consisting essentially of:

a mutually sintered matrix of:

a. hard particles of a catalyst for the oxidation of fat composed of at least one member of the group consisting of a metal selected from the group consisting of copper, vanadium, bismuth, molybdenum, manganese, iron, nickel, platinum-group metals tin, niobium, chromium, tungsten, phenium, cobalt and cerium, oxides of said metals, and compounds of two or more of said metals and oxides, and

b. enamel binder particles such that the enamel bound coating has a Mohs hardness of at least 3.0,

said hard catalyst particles being strong enough to prevent breakdown during the formation of the coating, said method comprising:

forming said catalyst for the oxidation of fat into catalyst particles,

mixing the catalyst particles with the enamel binder to form a mixture,

applying the mixture as a coating to the substrate, and

firing the coating,

the improvement wherein said hard particles of said catalyst are made by first making large hard catalyst particles having a strength equivalent to that of cylinders of length between half and double their diameters with a crushing strength of 1500–10,000 p.s.i.g. and then milling the large hard catalyst particles.

3,988,515

CASE-HARDENING METHOD FOR CARBON STEEL

Hiroshi Hashimoto, Chiba; Kiyomitsu Suga, Kawaguchi, and Toshio Shimizu, Tokyo, all of Japan, assignors to Kabushiki Kaisha Seikosha, Japan

Filed Feb. 11, 1975, Ser. No. 548,971
Claims priority, application Japan, Feb. 13, 1974, 49-17284
Int. Cl.² C23C 9/02
U.S. Cl. 427—249 4 Claims

1. In metallic cementation of carbon steel according to the solid powder method, a case-hardening method for carbon steel comprising the steps of preparing a powder mixture containing titanium in an amount of 5 to 30 % by weight of said mixture, chromium in an amount such that the weight ratio of chromium to titanium is within the range of 2 to 10, alumina and a catalyst which is a halogen salt, embedding carbon steel in said powder mixture, and then subjecting said mixture to a heat treatment to form a hardened layer mainly composed of titanium carbide TiC.

3,988,516

MANUFACTURE OF BONDED TEXTILE SHEET STRUCTURES

Felix Miksovsky; Rolf Fikentscher, both of Ludwigshafen, and Axel Sanner, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhein), Germany

Filed Jan. 23, 1975, Ser. No. 543,245

Claims priority, application Germany, Feb. 1, 1974, 2414794

Int. Cl.² B05D 3/10

U.S. Cl. 427—342 7 Claims

1. A process for the manufacture of bonded textile sheet structures which comprises applying:

a. a solution or an aqueous dispersion of a binderpolymer; and

b. from 6 to 40 percent by weight, based on the textile web structure, of a β-aziridino propionic acid ester or aziridino succinic acid ester or both of an ethylene oxide adduct with water or with a compound which is at least bifunctional containing OH, NH_2 or NH groups and containing from 2 to 6 carbon atoms, and in which the number of ethylene oxide units per functional group in said adduct is from 3 to 50, to a textile sheet structure and solidifying the polymer by drying the impregnated structure at elevated temperatures, followed by fixation of the aziridino compounds on the textile web structure in the presence of 3 to 40% by weight, based on the aziridino compounds, of an organic polymer with a K value of from 15 to 100 containing at least 3% by weight of the polymer of carboxyl, hydroxyl, NH_2 or NH groups as crosslinkers.

3,988,517

GAS KNIFE PROCESS FOR CONTROLLING HOT-DIP ALUMINUM COATINGS

Ralph W. Leonard, Plum Borough, and George R. Taylor, Jefferson Borough, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed May 19, 1975, Ser. No. 578,859

Int. Cl.² B05D 3/04, 3/12

U.S. Cl. 427—349 7 Claims

1. In the hot-dip aluminizing of ferrous metal strip, a method for controlling the thickness profile of the aluminum coating, which comprises;

a. passing the strip, at a line speed of 20 to 150 m/min., through a bath containing molten aluminum,

b. directing the strip with its molten aluminum coating adhering thereto, through a generally curvilinear, upwardly concave orifice gas knife having a slot opening, the length of which is greater than the width of the strip being coated, said opening exhibiting a maximum value at both ends of the slot length and decreasing in a generally uniform manner to a minimum value at the center of said slot length, said knife being situated a distance of 20 to 40 cm above the top surface of said bath,

c. establishing a gas barrier to said molten coating by maintaining (i) a knife pressure of at least 7 mm Hg and (ii) a knife to strip distance, at the strip edges, of from 0.3 to 2 cm, said gas barrier having a downward deflection of from 5° to 35°.

3,988,518

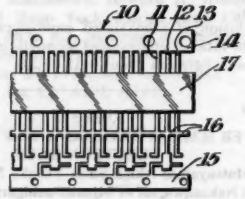
BATCH PLATING OF A LONG LEAD FRAME STRIP

N. Christian McGrath, Concord, N.H., assignor to Sprague Electric Company, North Adams, Mass.

Filed Aug. 15, 1975, Ser. No. 605,103

Int. Cl.² B05D 1/18

U.S. Cl. 427—436 3 Claims



1. A method for batch plating at least one long lead frame strip comprising winding said one metal lead frame strip and in inert interleaving ribbon together onto an inert reel so that adjacent turns of said wound lead frame strip are spaced apart by said ribbon, and submersing and plating said one strip on said reel in an immersion plating solution containing metal ions, said immersion plating being accomplished by a metal substitution reaction wherein metal ions from said solution are substituted for metal atoms at the surfaces of said strip including those in contact with said interleaving ribbon, said metal of said lead frame strip being selected from copper and alloys thereof, said inert interleaving ribbon being selected from polyimides, polyurethanes, fluorocarbons and nylon, and said metal ions being selected from tin, nickel and gold.

3,988,519

LAMINATES OF A POLYMERIC FILM AND A NONWOVEN FABRIC

Frederick L. Stoller, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 13, 1975, Ser. No. 540,563

Int. Cl.² B32B 27/12; B44F 9/12

U.S. Cl. 428—15 10 Claims

1. A leather-like laminate comprising:

a polymeric film selected from the group consisting of polyvinyl chloride, polyurethane and combinations thereof having a thickness in the range of from about 6 to about 20 mils; and

a nonwoven fabric of drawn synthetic staple fibers, said fabric having a weight in the range of from about 0.8 to about 7 oz./yd.² and a density in the range of from about 3 to about 14 lbs./ft.³ and being formed by needling a batt of staple fibers having a length in the range of from about 2 to about 7 inches

wherein said film and said fabric are bonded together to form said laminate; and

wherein said polymeric film comprises at least 50 to about 90 weight percent of said laminate.

3,988,520

THREE DIMENSIONAL IMAGE REPRODUCTION

Marlene A. Riddle, 8500 S. Welby Road, West Jordan, Utah 84084

Filed Oct. 6, 1975, Ser. No. 619,601

Int. Cl.² B44C 3/04

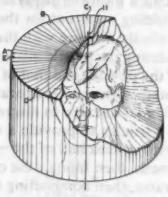
U.S. Cl. 428—15 11 Claims

1. A method for the three dimensional reproduction of an image which comprises steps of:

a. photographing the image at specified angles of rotation over 180° in a fixed plane about a fixed axis,

b. dividing the photographs thus obtained at the axis of rotation into two separate parts,

c. affixing each part of the divided photograph to a wedge shaped carvable material such that the side of the photograph forming the axis of rotation is at the pointed edge of the wedge, the angle of the wedge being the same as the angle of rotation between photographs, the wedge being made of such material that the outline of the photographed image is visible therein,



d. assembling each wedge into place so that the points of the wedges meet at a common axis of rotation and the divided photographs meet in a linear plane such that a 360° representation in outline form of the image is presented in the assembled wedges, and

e. carving each wedge along the outline of the photograph contained therein to obtain a three-dimensional reproduction of the image photographed.

3,988,521

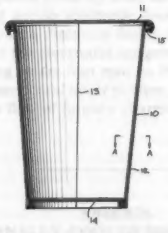
LAMINATED STRUCTURES AND METHODS AND COMPOSITIONS FOR PRODUCING SAME

Giancarlo J. Fumel, Lake Grove, and James A. Karabedian, Garden City, both of N.Y., assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 275,951, July 28, 1972, abandoned. This application May 2, 1975, Ser. No. 573,924

Int. Cl.² B32B *23/08, 27/08, 27/10*

U.S. Cl. 428—35 **4 Claims**



1. A container comprising a sidewall portion and a bottom portion, said sidewall portion extending upwardly from said bottom portion to an upper end thereof providing an open mouth rim of the container, said sidewall being formed from a laminated structure comprising: (1) a substrate of a high polymeric material, (2) a substrate of a porous hydrophilic cellulosic material, and (3) a layer bonding said substrates comprising particles of a polymer of the same kind as said high polymeric material substrate (1) but of an average molecular weight of from about 4 to about 100 per cent of said high polymeric material substrate bonded to the surface of said substrate (1) and a predominant amount of a water-dispersible adhesive preferentially adherent to said cellulosic substrate surrounding said bonded particles so as to mechanically interlock with said particles.

3,988,522

PAPER COATED WITH ORGANIC PIGMENT-CONTAINING COATING COLORS

Gregor Berstein, Newton, Mass., assignor to Cabot Corporation, Boston, Mass.

Division of Ser. No. 514,090, Oct. 11, 1974, Pat. No. 3,953,421, which is a continuation-in-part of Ser. No. 324,338, Jan. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 168,467, Aug. 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 59,731, July 3, 1970, abandoned. This application Nov. 24, 1975, Ser. No. 634,922

Int. Cl.² B32B *5/16;* **C08L** *3/02*

U.S. Cl. 428—323 **10 Claims**

1. Coated paper comprising a cellulose base paper layer coated on at least one side thereof with an adherent coating comprising a suitable polymeric binder dissolved or dispersed in an aqueous slurry of finely divided pigment solids, the principal proportion of which by weight are inorganic pigments of less than 2 microns in mean particle size, and which pigment solids, in an amount of from about 2 to about 25% by weight based upon the total weight of pigment solids employed in the coating color composition, are essentially water-insoluble, infusible, non-porous, cross-linked urea-formaldehyde pigments in a highly dispersed particulate form having a molar ratio of urea to formaldehyde ranging from about 1:1.3 to about 1:1.8, a BET specific surface area of from about 40 to about 75 square meters per gram, and a mean agglomerate size of from about 2 to about 3.5 microns.

3,988,523

GLASS FIBER REINFORCED ELASTOMERS

Frank Paul McCombs, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 354,980, April 27, 1973, Pat. No. 3,900,661. This application Nov. 11, 1974, Ser. No. 522,668

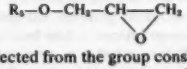
Int. Cl.² C08L *61/06;* **C03C** *25/02*

U.S. Cl. 428—378 **13 Claims**

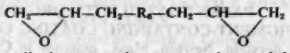
1. Glass fibers having a coating thereon, said coating comprising (A) a blend of a resorcinal-aldehyde resin and an elastomer and (B) a combination of organo silicon compounds comprising (1) an anchoring agent selected from the group consisting of an amino-substituted organo silane, its hydrolysis product and mixtures thereof and (2) 99 to 70% by weight of an organo silicon compound containing at least one beta-haloalkoxy group in the form of the reaction product of (a) a halosilane

$$(R_3)_eSiX_{(4-e)}$$

wherein R_3 is an organic group selected from the group consisting of alkyl, alkenyl, cycloalkyl and aryl, X is halogen and *e* is 0 or an integer from 1 to 2, (b) a monoepoxide selected from the group consisting of styrene oxide and a monoepoxide of the formula



wherein R_5 is selected from the group consisting of aryl, alkyl, alkenyl, methacrylo and acrylo and (c) at least one diepoxide selected from the group consisting of a diepoxide of the formula



wherein R_6 is a divalent organic group and a cyclohexane diepoxide.

3,988,524

POWDER METALLURGY COMPACTS AND PRODUCTS OF HIGH PERFORMANCE ALLOYS

Dennis G. Dreyer, Kokomo; Edward M. Foley, Russiaville, and Herbert E. Rogers, Jr., Sharpsville, all of Ind., assignors to Cabot Corporation, Kokomo, Ind.

Continuation-in-part of Ser. No. 323,502, Jan. 15, 1973, Pat. No. 3,846,126. This application Jan. 17, 1974, Ser. No. 434,091

The portion of the term of this patent subsequent to Nov. 5, 1991, has been disclaimed.

Int. Cl.² B32B *15/02;* B22F *1/00*

U.S. Cl. 428—403 **21 Claims**

1. A green powder metallurgy compact of high performance cobalt base, nickel base and iron base chromium containing alloys consisting essentially of a formed coherent green compact of a finely divided alloy metal powder having an average particle size of about 9 to about 30 microns of said high performance cobalt base, nickel base and iron base chromium containing alloys, precoated with a solid organic binder in an amount less than 5% by weight of the said alloy powder and having at least 50% of the cast density of the alloy, said compact having been produced by the steps comprising mixing alloy powder with a dry, finely divided organic binder in amounts not greater than about 5% by weight of the alloy powder so as to obtain a uniform dispersion of binder in the alloy powder, then adding a solvent for the binder in amount sufficient to form a plastic mixture with the alloy powder and binder, then consolidating the plastic mixture to a bulk density intermediate that of the powder and that of the cast alloy, then drying the consolidated mixture to evaporate the solvent, then crushing the consolidated mixture to discrete agglomerates of pre-alloyed powder particles to provide a substantial fraction of −100 mesh particles at least half of the −100 mesh particles of which are −325 mesh, then filling a die of the desired shape with those agglomerates, then compacting the agglomerates in the die to at least 50% of the cast density of the alloy, so as to produce a coherent green compact, and removing the compact from the die.

ELECTRICAL

3,988,525
DIRECT CURRENT ARC FURNACE WITH CHARGING MEANS

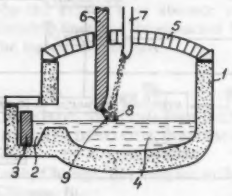
Sven-Einar Stenkvist, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Apr. 30, 1975, Ser. No. 573,312

Claims priority, application Sweden, May 21, 1974, 7406714

Int. Cl.² H05B 7/18

U.S. Cl. 13—11 3 Claims



1. A direct current arc furnace comprising a furnace vessel having a roof and a lower portion for containing a melt, said lower portion having an extension extending laterally from a peripheral portion of said lower portion and into which a portion of said melt can extend, a contact electrode positioned in said extension for immersion in said portion of the melt, at least one arcing electrode extending downwardly through said roof for forming an arc between the electrode and said melt at a position spaced inwardly from said extension and contact electrode, said arcing electrode forming an arc which becomes oblique in a direction facing away from said contact electrode when the electrodes are powered by direct current, said arc forming an arc foot spot on the surface of the melt in the furnace vessel's said lower portion, and means for continuously feeding a flow of furnace charging material into said arc foot spot.

3,988,526
INTERNALLY COOLED HIGH-VOLTAGE HIGH-ENERGY CABLE

Werner Rasquin, and Klaus Sütterlin, both of Cologne, Germany, assignors to Felten & Guilleaume Kabelwerke AG, Cologne, Germany

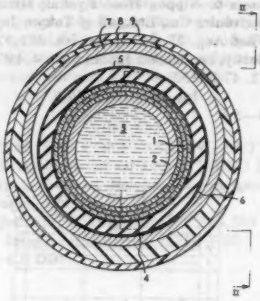
Filed Apr. 4, 1974, Ser. No. 457,778

Claims priority, application Germany, Apr. 5, 1973, 2317013

Int. Cl.² H01B 7/34

U.S. Cl. 174—15 C 9 Claims

1. An internally cooled high-energy cable, comprising a circumferentially complete elongated tubular member provided with at least one cooling channel for the flow of a cooling medium; an electric conductor tightly surrounding said tubular member and having a thickness which increases with increasing length of the cable as a function of the increase in the specific resistance of the conductor; electric insulation means surrounding said electric conductor; and a cable jacket



surrounding said electric insulation means and separated by the latter from said electric conductor.

3,988,527
WALL LEAD-THROUGHS FOR LIVE FEEDERS

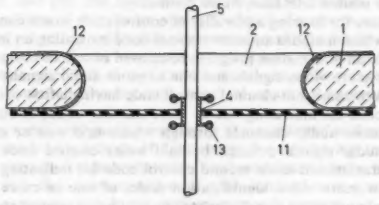
Robert Berger, Ennetbaden; Hans-Jacob Gloor, Wettingen, and Wilhelm Tschol, Fislisbach, all of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Feb. 11, 1975, Ser. No. 549,056

Claims priority, application Switzerland, Feb. 19, 1974, 2256/74

Int. Cl.² H01B 17/26; H01Q 1/50

U.S. Cl. 174—142 5 Claims



1. A wall lead-through structure for a live feeder which comprises a wall member having an opening therethrough, the entire wall surface defining said opening being provided with a metallic lining for corona protection, a mounting plate made from insulation material secured to one side of said wall member and covering the opening therethrough, said mounting plate being provided with a central opening coaxially aligned with the wall opening, a tubular metallic corona protector disposed within the central opening in said mounting plate and a live feeder passing through said wall opening and through said tubular corona protector.

3,988,528

SIGNAL TRANSMISSION SYSTEM FOR TRANSMITTING A PLURALITY OF INFORMATION SIGNALS THROUGH A PLURALITY OF TRANSMISSION CHANNELS

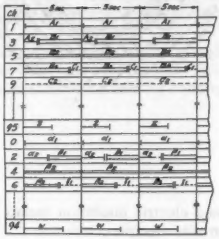
Akio Yanagimachi, Kawasaki; Hisakichi Yamane, Funabashi; Eiichi Sawabe, Machida; Takashi Uehara, Inagi; Takehiko Yoshino, Yokohama; Teruhiro Takezawa, Komae; Michio Masuda, Tokyo; Hiroaki Nabeyama, Yokohama; Masaaki Fukuda, Kodaira, and Tatsuo Kayano, Hachioji, all of Japan, assignors to Nippon Hoso Kyokai; Hitachi, Ltd. and Hitachi Electronics Co., Ltd., all of Tokyo, Japan

Filed Aug. 27, 1973, Ser. No. 391,978

Claims priority, application Japan, Sept. 4, 1972, 47-88551; Sept. 4, 1972, 47-88552

Int. Cl.² H04N 7/08

U.S. Cl. 178—5.6 **13 Claims**



1. A signal transmission system for transmitting a plurality of programmed information signals composed of audio signals each having an arbitrary time length and still picture video signals each included within a television frame period through a plurality of transmission channels, comprising at a transmitter end:

an information signal source for producing said audio and still picture video signals;

multiplexing means for arranging said audio signals to form a single signal chain, dividing the signal chain into a number of audio signal portions each having a given time period, and allocating each of the audio signal portions into each of a plurality of audio transmission channels;

means for adding a video identification code to each of the still picture video signals in a vertical blanking period of a related television frame period;

means for forming a plurality of control code words each of which includes an index control code indicating an index of an information program composed of one or more still picture video signals and one or more audio signals; and a transmission channel control code having a first control code for indicating one or more number codes of one or more audio channels through which said one or more audio signals denoted by said index control code are transmitted and a second control code for indicating one or more video identification codes of one or more still picture video signals denoted by said index control code;

means for allocating the control code words into at least one of said transmission channels and inserting them immediately before points of transition of the information signals; and

means for repeatedly transmitting said information signals and control code words at said given time period; and at a receiver end:

means for producing said index control code having an index of a desired information program to be reproduced;

means for detecting the first control code for denoting one or more audio transmission channels through which one or more audio signals composing said desired information program are transmitted and the second control code for denoting one or more video identification codes of one or more still picture video signals composing said desired information program together with said audio signals; and

means for extracting said desired audio and still picture video signals on the basis of the detected transmission channel control code.

3,988,529

TELEVISION TRANSMISSION

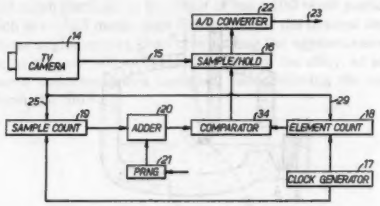
Alfred Brian Edwin Ellis, Chelmsford, England, assignor to The Marconi Company Limited, Chelmsford, England

Filed Dec. 9, 1974, Ser. No. 530,548

Claims priority, application United Kingdom, Jan. 23, 1974, 3101/74

Int. Cl.² H04B 3/30

U.S. Cl. 178—6 **16 Claims**



1. A method reducing the transmission bandwidth in a television transmitter in which each frame is built up of at least three fields each consisting of video information derived from a predetermined number of elemental areas distributed over the frame in a manner which appears random to the eye, comprising the steps of:

a. line scanning a television camera so that the scanning spot repetitively passes a large number of elemental areas during a frame period;

b. sampling the video output of said camera at a rate during each field period such taht the video outputs of one elemental area in each of a large number of successive groups of elemental areas are sampled during each field period; and

c. controlling the sampling between the successive groups of each field such that the particular elemental area sampled in each successive group is chosen in accord with a pseudo-random sequence of numbers.

3,988,530

AUTOMATIC DEFECT-DETECTING METHOD AND APPARATUS

Yoshizo Ikegami; Kuniomi Abe; Seijiro Kushibe, all of Kobe; Takao Yoshinaga, Kawanishi, and Tsunemasa Okada, Kobe, all of Japan, assignors to Konan Camera Research Institute and Sumitomo Metal Industries, Ltd., Japan

Filed Sept. 30, 1975, Ser. No. 618,263

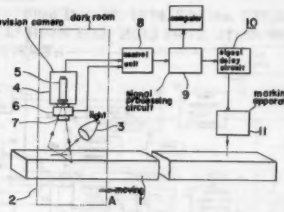
Claims priority, application Japan, Oct. 2, 1974, 49-114144

Int. Cl.² H04N 7/19

U.S. Cl. 178—6 **5 Claims**

1. In a defect detecting method for detecting defects in the surface of a material to be examined by scanning the surface of the examined material having a fluorescent magnetic powder thereon by a means for producing a scanning signal having a level of strength corresponding to the concentration of the fluorescent powder on the scanned surface, the automatic defect detecting method comprising the step of picking up said scanning signal for each of a series of adjacent scanning lines and comparing the scanning signal with a predetermined pulse width from among the thus obtained signal pulses for producing first defect indicating signals, the step of differentiating the scanning signals corresponding to said scanning lines and comparing the differentiation signal with a predetermined

level to obtain signal pulses above the given level for producing second defect indicating signals, and the step of producing the logical sum of said first defect indicating signals and said



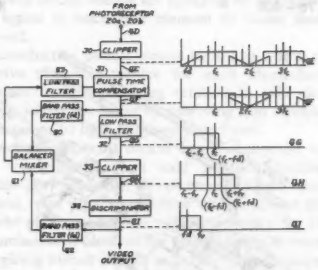
second defect indicating signals for corresponding scanning lines, whereby the existence or absence of the defects on particular scanning lines can be detected by existence and absence of the logical sum signals.

3,988,531

SYSTEM FOR COMPENSATING FOR INCORRECT DUTY FACTOR WHEN READING OUT INFORMATION STORED IN A VIDEO DISC

Leonard J. Laub, Chicago, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Apr. 2, 1975, Ser. No. 564,388
Int. Cl.² H04N *5/76;* **G11B** *7/00*
U.S. Cl. 178—6.6 DD **4 Claims**



1. In an optical playback system for reading out information stored in the form of a track on a video record, which track comprises a succession of pits separated by lands and for which there is a desired duty factor but which, in the presence of pit distortion, exhibits duty factor error, said pits and lands collectively constituting a spatial representation of a carrier signal frequency modulated by a band of video components and by another component unrelated to video information which component, in the presence of duty factor error, produces a spurious counterpart in the baseband, an arrangement for adjusting duty factor to compensate for duty factor error which comprises:

photoreceptor means responsive to the reading of said record track with a beam of energy for deriving an output signal representative of said frequency modulated carrier signal and, in the presence of duty factor error, further representative of said spurious component which has a phase and intensity indicative of the sense and extent of said duty factor error;

a frequency selector for deriving said spurious component from the output of said photoreceptor means;

a compensator comprising:

means responsive to said derived output signal for developing a first set of timing signals;

means responsive to said derived spurious component for selectively delaying alternate transitional portions of said derived output signal by an amount related to the amplitude of said spurious component for developing a series of adjusted width pulses;

means responsive to said adjusted width pulses for developing a second set of timing signals; and

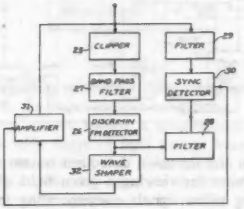
means responsive to said first and second set of timing signals for generating a signal having a duty factor corresponding to said desired duty factor for adjusting the duty factor of said derived frequency modulated output signal to compensate for said duty factor error.

3,988,532

ARRANGEMENT FOR COMPENSATING DUTY FACTOR VARIATIONS IN AN OPTICAL VIDEO DISC

Adrianus Korpel, Prospect Heights, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Apr. 2, 1975, Ser. No. 564,389
Int. Cl.² H04N *5/76;* **G11B** *7/00*
U.S. Cl. 178—6.6 DD **2 Claims**



1. In an optical playback system for reading out information stored in the form of a track on a video record, which track comprises a succession of alternating pits and lands, said pits and lands collectively constituting a spatial representation of a carrier signal having a frequency less than twice the highest video frequency and frequency modulated by a baseband signal comprising a band of video components and another component unrelated to video information and having a frequency less than the lowest frequency in the modulated spectrum, said pits and lands being further representative, under a condition of duty factor error, of a band of spurious components related to said video components and of a counterpart component related to said other component and overlapping a lower sideband of said carrier signal, an arrangement for effectively eliminating said band of spurious components comprising:

photodetector means responsive to a reading of said record track with a beam of light energy for developing an output signal representative of said modulated carrier signal and also representative of said band of said spurious components, when duty factor error is present;

means coupled to the output of said photodetector means for deriving said counterpart component;

detector means coupled to the output of said photodetector means for demodulating said carrier signal;

a frequency selector coupled to the output of said detector for deriving said other component;

a synchronous detector responsive to said counterpart component and to said other component for developing an error signal having a polarity and amplitude proportional to duty factor error;

wave shaping means coupled to the output of said detector for altering the configuration of a portion of said detected baseband signal to simulate said band of spurious components;

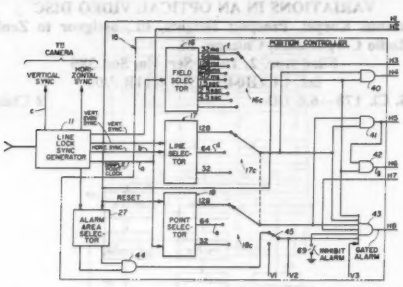
controllable gain means responsive to said error signal and to said simulated signal for developing a feedback signal having a polarity and amplitude effective to cancel said band of spurious components; and

means for coupling said feedback signal to the output of said photoreceptor means to substantially eliminate said spurious components from said output signal.

3,988,533
VIDEO-TYPE UNIVERSAL MOTION AND INTRUSION DETECTION SYSTEM

Peter Mick, East Orange, and Donald Beck, Boonton, both of N.J., assignors to Video Tek, Inc., Mountain Lakes, N.J.

Filed Sept. 30, 1974, Ser. No. 510,627
Int. Cl.² H04N 7/18
U.S. Cl. 178—6.8 **26 Claims**



1. A motion and intrusion detection system comprising:

a video camera for viewing a given field of view and for generating video signals corresponding to said field of view;

means responsive to said video signals for converting said video signals into a plurality of coded digital signals which correspond to the grey level of said video signal at a plurality of points in said field of view of said camera;

storage means for selectively storing said coded information corresponding to said plurality of points;

means for comparing predetermined coded information corresponding to said plurality of points from a first scan of said camera with the coded information corresponding to said plurality of points generated during a subsequent scan of said camera on a point-by-point basis;

means for generating an alarm signal when the difference between said compared signals for corresponding points exceeds a predetermined value; and

means responsive to said alarm signals for generating an alarm indication.

3,988,534
ELECTRO-OPTICAL TRACKING COMPUTER UTILIZING TELEVISION CAMERA

Jacob M. Sacks, Palos Verdes Peninsula, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed July 28, 1969, Ser. No. 848,401
Int. Cl.² H04N 7/18
U.S. Cl. 178—6.8 **16 Claims**

1. In combination:

a television camera for generating bipolar video signals representing targets within its field of view, said camera including a video monitor,

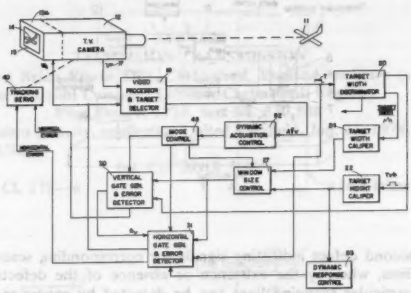
means for full wave rectifying said signals to convert them to unipolar form,

means for generating a tracking gate,

means for automatically controlling the dimensions of said gate in accordance with the dimensions of one of said video signals representing a selected target,

means for eliminating video signals of less than a predetermined width,

means for comparing said gate and said signals representing a selected target for time coincidence, and generating



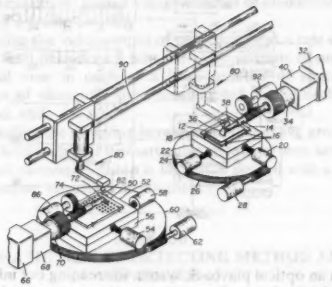
error signals whenever they tend to drift out of coincidence, and

tracking servo means responsive to said error signals for slewing said camera so as to minimize said error signals.

3,988,535
AUTOMATED POSITIONING

Henry H. Hickman, Woodridge; Avinash R. Kalke, Lisle; Walter Lach, La Grange Park, and Ronald F. Myscofski, Lisle, all of Ill., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Nov. 4, 1975, Ser. No. 628,729
Int. Cl.² H04N 7/18
U.S. Cl. 178—6.8 **8 Claims**



1. A method of positioning an article having at least one prominent feature including generating first video signals representing the article including all prominent features which comprises;

generating second video signals representing a first position marker;

generating a third video signal representing a second position marker;

moving the article in a direction to bring a prominent feature into a position wherein the first video signals of that prominent feature coincide with the second video signals of the first position marker;

moving the article in a direction to bring a prominent feature into a position wherein the first video signals of that prominent feature coincide with the third video signals of the second position marker; and

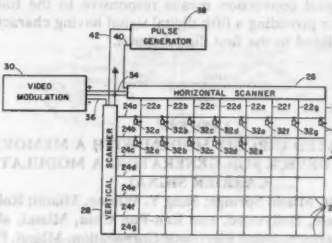
moving the article to a position midway between its positions at which coincidence was achieved with the first position marker and the second position marker.

3,988,536

SCANNING APPARATUS FOR TELEVISION DISPLAY OR PICK-UP

Anthony C. Moricca, 7137 Rose Ann Parkway, Fort Wayne, Ind. 46804

Filed Dec. 30, 1974, Ser. No. 537,267
Int. Cl.² H04N 3/12; H01J 39/12, 31/50; H05B 37/00
U.S. Cl. 178—7.1 7 Claims



1. For use in a scanning apparatus, a control device including a layer of electroluminescent phosphor, contacts for said phosphor layer for applying energizing voltage thereto, a transparent insulating layer superposed said phosphor layer, at least three film-like elements of photoconductive material superposed upon and spaced from said insulating layer and said film-like elements each being supported by two elongate contacts spaced apart.

3. Scanning apparatus comprising a plurality of electroluminescent elements arranged in sequence which luminesce in response to an energizing electrical signal applied thereto,

energizing circuit means for applying an energizing electrical signal to each said element to cause liminescence thereof,

photoconductive circuit means including a first photoconductive switching device for each electroluminescent element in light-receiving relation to said element for extinguishing the latter by removing said electrical signal in response to light received therefrom,

said energizing circuit means being connected to each of said elements through said photoconductive circuit means for applying an electrical signal sequentially thereto, said photoconductive circuit means includng a second photoconductive switching device for each electroluminescent element for conductively connecting said energizing circuit means to each electroluminescent element upon luminescence of the preceding element whereby said elements are caused to luminesce and extinguish in sequence,

said energizing circuit means includes a source of voltage pulses recurring at a predetermined repetition rate,

each electroluminescent element has its first and second photoconductive switching devices disposed in light-receiving relation thereto, each second switching device of each electroluminescent element being series connected between said energizing circuit means and the next succeeding electroluminescent element, the first switching device of each electroluminescent element being shunt connected across said electroluminescent element whereby luminescence of each electroluminescent element results in shorting the application of energizing voltage pulses thereto,

for each electroluminescent element third and fourth photoconductive switching devices disposed in light-receiving relation thereto, and

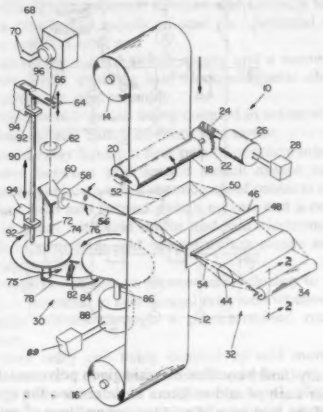
the fourth switching device of each electroluminescent element being series connected to the third switching device of the succeeding electroluminescent element, and a video signal circuit, said third switch device being in shunting relation to said video signal circuit.

3,988,537

ILLUMINATING AND TRANSMITTING SYSTEM

Austin G. Cooley, 690 W. Second St., Reno, Nev. 89503

Filed June 14, 1974, Ser. No. 479,205
Int. Cl.² H04N 3/08, 1/10; G03B 27/54
U.S. Cl. 178—7.6 4 Claims



1. In an illuminating system for illuminating a sheet containing information, the improvement comprising:

a light energy source having a longitudinal aperture for emitting a wide beam of light energy having a reduced height dimension compared to its width;

a stop having a wide stop aperture therein with a reduced height dimension compared to its width;

a first cylindrical condensing lens arranged between said light source and said stop for focusing said light energy upon said stop aperture, the height dimension of said stop aperture being relatively large to reduce diffraction;

a second cylindrical condensing lens arranged between said stop and said sheet for focusing upon said sheet said light energy from said stop aperture for permanently and uniformly illuminating with the image of said light source aperture a wide transverse area upon said sheet whose height dimension is relatively samll compared to the height of said light source aperture and the height of said stop aperture for eliminating diffraction at said illuminated area while providing a wide permanently and uniformly illuminated transverse area upon said sheet having a relatively small height.

3,988,538

DIGITAL DATA SCRAMBLER AND DESCRAMBLER

Michael David Patten, Bishop Stortford, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Feb. 26, 1975, Ser. No. 553,349
Claims priority, application United Kingdom, Mar. 7, 1974, 10238/74
Int. Cl.² H04L 9/00; H04K 1/00
U.S. Cl. 178—22 15 Claims

8. A digital data scrambler for a digital data transmission system comprising:

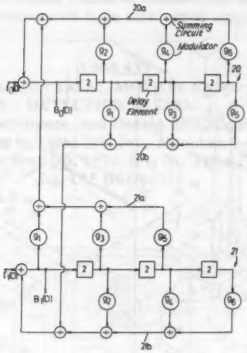
m inputs each associated with a different one of *m* input synchronized binary coded data stream, where *m* is an integer greater than one;

m linear sequential filters each coupled to a different one of said *m* inputs;

a given number of feedback paths coupled to each of said *m* filters from the output to the input of each of said *m* filters; and

a plurality of tap connections coupled between each of said *m* filters and associated ones of said feedback paths;

the nature and disposition of said tap connections being determined in accordance with a given polynomial having



only binary coefficients, said given polynomial being used for each of said *m* filters to determine the cyclic shifting of the sequence of said tap connections of each of said *m* filters with respect to the input of said *m* filters, from one of said *m* filters to the next of said *m* filters.

3,988,539

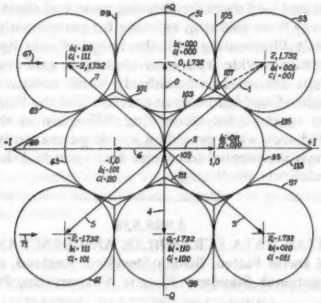
DATA TRANSMISSION SYSTEM USING OPTIMAL EIGHT-VECTOR SIGNALING SCHEME

David M. Motley, Santa Ana, and King Y. Cheng, Tustin, both of Calif., assignors to Hycom Incorporated, Irvine, Calif.

Filed Sept. 16, 1974, Ser. No. 506,208

Int. Cl.[2] H04L 27/18

U.S. Cl. 178—67 **26 Claims**



4. A transmission system responsive to a first digital signal for transmitting information on a transmission line comprising:

first signal conversion means responsive to the first signal for providing a second digital signal having in-phase components and quadrature components, each of the in-phase components defining with an associated one of the quadrature components one of eight vectors, each of said eight vectors having a magnitude and a minimum separation distance, said minimum separation distances for said vectors being approximately equal, and the average of the vector magnitudes squared being not greater than about four and one-half times the minimum separation distance;

means for processing the second digital signal to provide a third signal and for introducing the third signal to the transmission line;

means responsive to the information from the transmission line for processing the information to produce a fourth digital signal having in-phase components and quadrature components which define a plurality of vectors with characteristics dependent upon the information received from the transmission line; and

second signal conversion means responsive to the fourth signal for providing a fifth digital signal having characteristics related to the first digital signal.

3,988,540

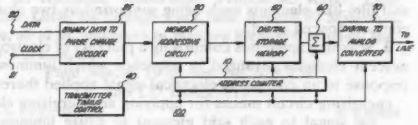
INTEGRATED CIRCUIT MODEM WITH A MEMORY STORAGE DEVICE FOR GENERATING A MODULATED CARRIER SIGNAL

John B. Scott, Miami Springs; Sang Y. Whang, Miami; Robert G. Ragsdale, Hollywood, and Ran-Fun Chiu, Miami, all of Fla., assignors to Milgo Electronic Corporation, Miami, Fla.

Continuation of Ser. No. 250,667, May 5, 1972, abandoned. This application Dec. 10, 1974, Ser. No. 531,296

Int. Cl.[2] H04L 27/20

U.S. Cl. 178—67 **19 Claims**



1. In a continuous carrier communication system wherein a carrier signal is phase-modulated according to binary data, apparatus for generating said phase modulated carrier signal, comprising:

memory means for storing in each of M addressable locations (M being an integer), N words, said words being divided into P sectors (both N and P being integers), the N words in each of said M addressable locations being an encoded representation of a unique phase modulated carrier signal that has been passed through a linear phase narrow bandwidth filter having a passband width defined as $1/T$ Hz with a center frequency of f_o, where T is the modulation period and f_o is the carrier signal frequency, each of said P sectors being an encoded representation of one modulation period T;

means responsive to said binary data, for addressing the M locations in said storing means according to a sequence determined by the binary data;

means for reading from said memory means, each time one of said M addressable locations is addressed, one of said N words from its respective sector P;

each sector of said P sectors in their respective M locations in memory being read out so as to be offset from the sector in another of said M addressable locations by one sector; and

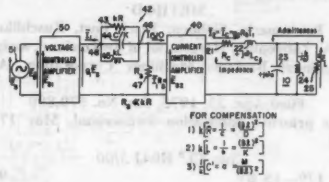
means for adding the N words read from their respective sectors during one addressing sequence for the M locations in said storing means, thereby generating a phase modulated, filtered carrier signal.

3,988,541

METHOD AND APPARATUS FOR FREQUENCY COMPENSATION OF ELECTRO-MECHANICAL TRANSDUCER

Warren B. Boast, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jan. 14, 1975, Ser. No. 540,806
Int. Cl.² H04R 3/04
U.S. Cl. 179—1 D 20 Claims



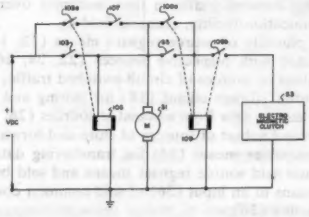
1. In combination with an electro-mechanical transducer having mechanical response parameters of known valve and including current-carrying conductor means in a magnetic field wherein the response characteristic of said transducer is a known function of the frequency of the drive current in said conductor means, the improvement comprising: drive circuit means receiving an input signal for supplying a drive current to said current-carrying conductor means of said transducer; and compensation network means in circuit with said drive circuit means for modifying the frequency characteristic and the input signal to be the complement of the frequency response characteristic of said transducer, said compensation network means including resistive, capacitive and inductive components each having a value determined by a corresponding one of the mechanical response parameters of said transducer.

3,988,542

VARIABLE MESSAGE RECORDER USING A DISC WITHOUT GROOVES AND A SINGLE MOTOR TO PROVIDE BOTH TURNTABLE DRIVE AND SPIRAL SCANNING

Joseph J. Zimmermann, Elm Grove, Wis., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Division of Ser. No. 529,327, Dec. 4, 1974. This application July 28, 1975, Ser. No. 599,505
Int. Cl.² H04M 1/64
U.S. Cl. 179—6 R 2 Claims



1. In an automatic telephone answering device having a motor coupled across a source of d.c. potential for rotatably driving a turntable and having a tone arm assembly which is scanned laterally across a disc positioned on said turntable by means including an electronic clutch coupled in shunt with said motor, apparatus comprising:

first switch means for momentarily applying said d.c. potential to said motor responsive to receipt of an incoming ringing signal by said automatic telephone answering device;

latching means including a first relay having a coil coupled in shunt with said motor and a pair of contacts connected in shunt with said first switch means for coupling said d.c. potential to said motor after said first switch means is opened, said coil being enable by the momentary application of said d.c. potential to close said contacts to maintain a continuous supply of said d.c. potential to said motor and said coil; and

means including second switch means and a second relay for selectively enabling said electromagnetic clutch to scan said tone arm assembly,

said second switch means being coupled in series with said electromagnetic clutch to shunt said motor,

said second relay having a first pair of contacts interposed in series between said second switch means and said electromagnetic clutch, a second pair of contacts coupled in shunt with said second switch means, and a coil coupled in shunt with said motor and said electromagnetic clutch intermediate said second switch means and said first contact pair,

said second switch means momentarily closing to couple said d.c. potential to said second relay coil whenever said turntable rotates through a predetermined rotational position,

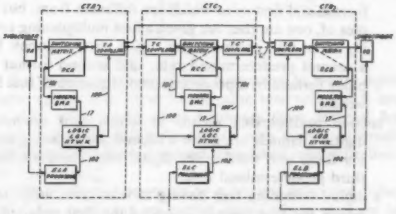
said second relay coil being enabled by said momentary application of d.c. potential to close said first and second contact pairs to maintain a continuous supply of said d.c. potential to said second relay coil and said electromagnetic clutch.

3,988,543

INTER-OFFICE SIGNALING SYSTEM FOR TELECOMMUNICATION NETWORK

Cristiano Dall'Olio, and Enzo Garetti, both of Turin, Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni, Turin, Italy

Filed Apr. 2, 1975, Ser. No. 564,549
Claims priority, application Italy, Apr. 2, 1974, 68039/74
Int. Cl.² H04J 1/14
U.S. Cl. 179—15 FD 10 Claims



1. In a telecommunication system including a plurality of central offices each associated with a group of subscriber stations, a multiplicity of inter-office channels for the exchange of messages between subscribers of different groups, and a processor at each central office adapted to seize a channel leading to a central office associated with a remote subscriber station identified by selection signals from a local subscriber station, in combination:

a multiplicity of couplers at each central office connected to respective channels terminating thereat;

a plurality of centralized modems at each central office adapted to translate routing instructions from said processor into outgoing line signals transmittable via said couplers over a seized channel in a frequency band allocated to message transmission and to retranslate incoming line signals from a seized channel into data recognizable by said processor;

storage means at each central office for continuously registering the state of availability of each of said modems; and

switching means at each central office connected to said storage means and controlled by said processor for temporarily connecting an available modem to a seized channel through the coupler thereof in response to incoming line signals and to local selection signals, each coupler including circuitry for recognizing and repeating outgoing and incoming line signals.

3,988,544

TIME-DIVISION SWITCHING NETWORK FOR SWITCHING MULTIFORMAT MULTIPLEXED DATA

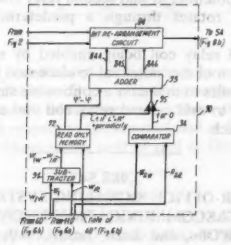
Alain Texier, 32, Avenue du General De Gaulle, Meudon la Foret, and Edgar L. Lapeyronnie, 139, Boulevard Maxime Gorki, Villejuif, both of France

Filed Dec. 29, 1975, Ser. No. 644,836

Claims priority, application France, Dec. 31, 1974, 74.43512

Int. Cl.² H04Q *11/04*

U.S. Cl. 179—15 BV **4 Claims**



1. A multirate time-division digital switching network comprising:

first multiplexing means in which first-order digital data channels transmitting words having a first and a second formats which are different from, but multiples of, a given format and first rates which are different from, but multiples of, one another are given a first multiplexing converting them into second-order digital data channels having a second predetermined rate, said second format words being formed by a predetermined sequence of first format words;

second multiplexing means in which said second-order digital channels are given a second multiplexing converting them into third-order digital data channels having a third predetermined rate:

a digital switching unit having at least one buffer store in which the first format words of the first-order channels multiplexed into the third-order channels are grouped at a resultant address having first and second part, whose first part is the address of the second-order channel containing the first format word of the first-order channel in the third-order channel and whose second part is the address of the first-order channel in the second-order channel;

means for inserting, in each of the first format words of a second-order channel, bits forming a pseudorandom sequence having a known period so that the bits of a given rank of the words of a third-order channel form a number of interleaved pseudorandom sequences;

means for separating said pseudorandom sequences and for deriving therefrom the addresses of the first format words in the second-order channels;

means for deriving from said addresses of the first format words the addresses of the first order channels;

means for deriving from the addresses of the first format words additional addresses significative of the serial number of the first format word in the second format word forming sequence; and

means for re-arranging the first format words in the second format word forming sequence according to their additional addresses.

3,988,545

METHOD OF TRANSMITTING INFORMATION AND MULTIPLEXING DEVICE FOR EXECUTING THE METHOD

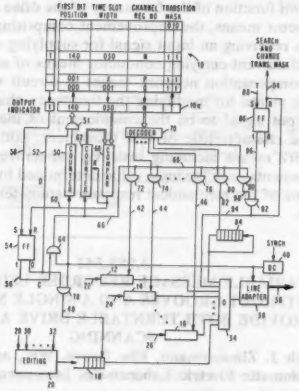
Karl A. Kuemmerle, Siebnen; Erich Port, Ruschlikon, and Pitro A. Zafiropulo, Horgen, all of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 23, 1975, Ser. No. 570,890

Claims priority, application Switzerland, May 17, 1974, 6780/74

Int. Cl.² H04J *3/00*

U.S. Cl. 179—15 BV **9 Claims**



1. Multiplexing device for handling circuit-switched and store-and-forward traffic in time multiplex over a common communication facility, characterized by

a. a plurality of source register means (**12, 14, 16**) associated with respective sources (**22, 24, 26**) of a first subset of sources of circuit-switched traffic;

b. buffer storage means (**18**) for storing and sequentially releasing data from associated sources (**28, 30, 32**) of a second subset of sources of store-and-forward traffic;

c. assembler means (**34**) for transferring data alternately from said source register means and said buffer storage means to an input (**36**) of said common communication facility (**38**);

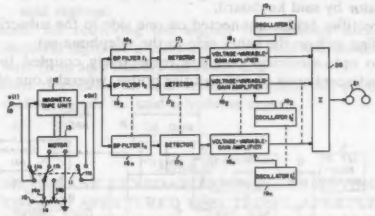
d. first selection means (**10*a*, 42 . . . 46, 50 . . . 76**) for selectively activating source register means outputs to effect release of data elements to said assembler means during discrete sub-intervals of repetitive frames in accordance with control data stored in a control store (**10**) which is connected to the selection means; and

e. second selection means (**52, 54, 48, 78**) for activating the buffer storage means to release data elements to said assembler means only during discrete time gaps between said discrete sub-intervals.

3,988,546
SYSTEM FOR AUDIBLY RECOGNIZING AN AURALLY UNCLASSIFIABLE SIGNAL

Michael J. DiToro, Massapequa, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Filed Sept. 13, 1974, Ser. No. 505,556
Int. Cl.² G10L 1/02
U.S. Cl. 179—15.55 T 9 Claims



1. A system for audibly recognizing a received signal aurally unclassifiable because of its improper duration and/or the frequency band occupied thereby comprising:

a signal-storage device;

means for storing the signal in said device as received;

means for retrieving said signal from said device at a time-rate differing from the storing rate;

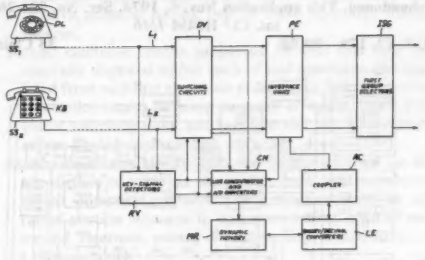
and means for deriving from said retrieved signal a signal having characteristics capable of audible recognition;

said signal-deriving means having an output circuit for delivering said derived signal for audible recognition.

3,988,547
TELECOMMUNICATION SYSTEM HAVING MEANS FOR CONVERTING MULTIFREQUENCY SELECTION SIGNALS INTO DIGITAL PULSE TRAINS

Enrico Cicognani; Riccardo Caldarella; Athos Antonini, and Alfonso Lamartina, all of Milan, Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Jan. 29, 1975, Ser. No. 545,219
Claims priority, application Italy, Jan. 29, 1974, 19917/74
Int. Cl.² H04Q 1/30
U.S. Cl. 179—16 EC 10 Claims



1. In a telecommunication system, in combination:

a multiplicity of subscriber lines originating at calling stations provided with digital signaling means for identifying a called party, said signaling means including multifrequency generators in the case of at least some of said stations;

selector means responsive to digital pulse trains connected to said subscriber lines for connecting said lines to a called party;

detector means connected to said subscriber lines between said stations and said selector means for actuation by a characteristic signal indicative of the use of a multifrequency generator;

first conversion means for translating multifrequency signals into binary signal codes;

switching means in each subscriber line controlled by said detector means for directing multifrequency signals to said first conversion means in response to the presence of said characteristic signal on the line;

multistage memory means connected to said first conversion means for the simultaneous storage of signal codes from different subscriber lines;

line-identifying means controlled by said detector means for generating an individual address code accompanying each signal code in said memory means;

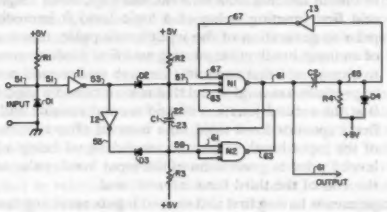
second conversion means connected to said memory means for receiving said signal codes therefrom together with the accompanying address codes and translating said signal codes into digital pulse trains; and

coupling means connected to said second conversion means for introducing said digital pulse trains into the subscriber lines identified by the accompanying address codes, at a location between said switching means and said selector means.

3,988,548
DIAL PULSE CORRECTION CIRCUIT FOR TELEPHONE SIGNALING SYSTEM

Gary C. Waldeck, Scottsdale, Ariz., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 2, 1975, Ser. No. 636,854
Int. Cl.² H04Q 1/36
U.S. Cl. 179—16 EA 18 Claims



1. A dial pulse correction circuit responsive to binary input dial pulse signals with input break pulse intervals which are greater than a first prescribed minimum time interval for producing corrected dial pulse signals with corrected break pulse intervals of at least a second prescribed minimum time interval, comprising:

first timing means responsive to a binary input dial pulse signal for producing an output signal which changes to one logic level at the end of a third time interval after initiation of an input break pulse which has a duration that is greater than that of the first prescribed time interval, the duration of the third time interval being equal to that of the first time interval, the output signal of said first timing means being of an other logic level prior to generation of the input break pulse;

second timing means responsive to the binary input dial pulse signal for producing an output signal which is maintained in the other logic level for a fourth time interval after termination of the input break pulse, the output signal of said second timing means changing from the one to the other logic level on generation of the input break pulse and being of the one logic level at the end of the fourth time interval; and

logic means having first and second inputs receiving output signals of said first and second timing means, respectively, said logic means being operative for generating a corrected break pulse of the other logic level and of at least

a minimum duration that is equal to that of the second time interval when the logic level of the output signal of said first timing means changes to the one logic level when the output signal of said second timing means is of the other logic level and being operative for terminating the corrected break pulse when the output signal of said second timing means is of the one logic level following a time interval measured from generation of the corrected break pulse, the latter time interval having a duration that is at least equal to that of the second time interval.

11. A dial pulse correction circuit responsive to binary input dial pulse signals with input break pulse intervals which are greater than a first prescribed time interval for producing corrected dial pulse signals with corrected break pulse intervals of at least a second prescribed minimum time interval, comprising:

a source of supply voltage;

a first resistor and first diode electrically connected in series between said voltage source and a first terminal;

a second resistor and second diode electrically connected in series between said voltage source and a second terminal;

a first timing capacitor electrically connected between the sides of said first and second resistors that are spaced from said voltage source;

first means receiving input dial pulse signals and coupling input dial pulse signals with positive and negative going break pulses to said first and second terminals, respectively;

generation of an input break pulse causing said second diode to conduct to charge said first capacitor through said first resistor to produce a first signal of a logic level 1 at the first junction of said first resistor and first capacitor following a first time interval after initiation of an input break pulse having a duration that is at least equal to that of the first time interval, this logic level 1 signal at said first junction being of a logic level 0 immediately prior to generation of the input break pulse; termination of an input break pulse causing said first diode to conduct to charge said first capacitor through said second resistor to produce a second signal that is maintained a logic level 0 at the second junction of said second resistor and said first capacitor for a third time interval after termination of the input break pulse, the second signal being a logic level 1 prior to generation of the input break pulse and at the end of the third time interval; and

logic means having first and second inputs receiving the first and second signals at said first and second junctions, respectively, for generating a corrected break pulse of a logic level 0 when the logic level of the first signal changes to a logic level 1, the duration of the corrected break pulse being of at least a minimum duration that is equal to that of the second timing interval; said logic means terminating the corrected break pulse when the second signal is a logic level 1 following a time interval measured from generation of the corrected break pulse and having a duration that is at least equal to that of the second time interval.

3,988,549

KEYBOARD TYPE TELEPHONE STATION ADAPTED TO TRANSMIT DIALLING PULSES AND MULTIFREQUENCY SIGNALS

Jean C. Merlin, 2, rue Lamartine, 92130 Issy-les-Moulineaux, and Bernard M. Serres, 51, avenue de la Paix, 94260 Fresnes, both of France

Filed Feb. 10, 1975, Ser. No. 548,580

Claims priority, application France, Feb. 14, 1974, 74.05051

Int. Cl.² H04M *1/30, 1/50*

U.S. Cl. 179—90 K **2 Claims**

1. In combination a telephone set arrangement connected to a telephone exchange by a subscriber's line and supplied therefrom by a direct current, the supply direct current direction being reversed in said telephone exchange upon completion of a call, said telephone set arrangement comprising:

a telephone set;

a keyboard with a plurality of keys;

a call pulse train generator;

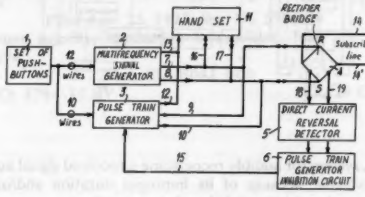
means for controlling said call pulse train generator by said keyboard;

a call multifrequency signal generator;

means for controlling said call multifrequency signal generator by said keyboard;

a rectifier bridge connected on one side to the subscriber's line and on the other side to the telephone set;

two opto-electrical couplers respectively coupled to two adjacent arms of said rectifier bridge, whereby one of said



opto-electric couplers is operative when the supply current has a given direction and the other opto-electric coupler is operative when the supply direct current direction is reversed in relation to said given direction;

two flipflops respectively connected to said opto-electric couplers;

an AND-gate having inputs connected to said flipflops;

a direct current reversal detecting flipflop connected to the output of said AND-gate; and,

means controlled by said direct current reversal detecting flipflop for inhibiting the control means of the call pulse train generator by the keyboard when the supply direct current is reversed in the telephone exchange upon completion of the call.

3,988,550

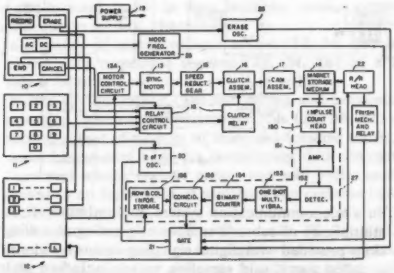
TELEPHONE REPERTORY DIALER

Si-Ling Ts'ao, 39-1 Alley 30, Lane 172, Section 1, Keelung Road, Taipei, China /Taiwan

Continuation-in-part of Ser. No. 436,177, Jan. 24, 1974, abandoned. This application Nov. 6, 1974, Ser. No. 521,266

Int. Cl.² H04M *1/46*

U.S. Cl. 179—90 BB **35 Claims**



1. An automatic telephone dialing apparatus for use with a dial telephone system comprising

means for storing information concerning a plurality of telephone numbers, each number being represented by a plurality of numeral digits in pre-assigned digit positions, said storing means including

a storage medium; and

means for storing numeral identification signals representing the numeral digits of said plurality of telephone numbers at a plurality of separate regions of said medium, the storage thereof being arranged so that the signals representing the numeral digits of said telephone numbers which are in corresponding digit positions thereof form at least one of a plurality of separate groups, each group being stored at a different one of said regions;

means for retrieving the signals representing successive numeral digits of a selected one of said telephone numbers from said storage medium; and

means responsive to said retrieved signals for producing dialing signals for said telephone system.

3,988,551

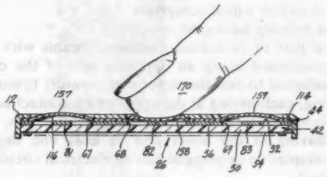
MEMBRANE KEYBOARD APPARATUS HAVING COMMON APERTURED ELECTRODE, APERTURE INSERTED ELECTRODES AND CONDUCTIVE BUBBLE CONTACTORS

Willis August Larson, Mequon, Wis., assignor to Magic Dot, Inc., Minneapolis, Minn.

Filed Apr. 3, 1975, Ser. No. 564,913

Int. Cl.² H01H *13/64*

U.S. Cl. 200—5 A **9 Claims**



1. A membrane keyboard apparatus for selectively activating two or more electrical circuits, said apparatus comprising.

an insulator having a first face;

first electrode means supported on said first face, said first electrode means comprising a sheet of electrically conductive material having two or more apertures formed therein;

second electrode means supported on said first face and centrally disposed within each of said apertures and insulated from said first electrode means, said first and second electrodes means defining an array of two or more individual switching units, and said first and second electrode means having coplanar top surfaces;

membrane means having a contact face supported on the top surface of said first electrode means, said membrane means comprising flexible sheet means having an upraised portion adjacent to and spaced from each of said second electrode means corresponding to said array of switching units;

conductive means formed on the contact face of said membrane means extending at least along the surfaces of said upraised portions and their peripheries adjacent each of said first and second electrode means for selectively providing an electrical connection between said individual switching units by depression of said upraised portions;

means for securing said membrane means securely against said first electrode means; and

means for providing an electrical connection between said first and second electrode means and said electrical circuits.

3,988,552

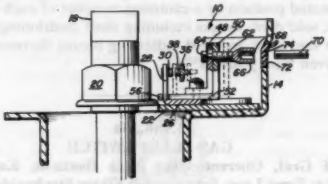
EXTERNAL ADJUSTMENT SYSTEM FOR DISTRIBUTOR POINTS

Michael Faben, Woodland Hills, Calif., assignor to Kenneth Herschman, Los Angeles, Calif.

Filed July 11, 1975, Ser. No. 595,123

Int. Cl.² H01H *1/24, 19/62*

U.S. Cl. 200—31 A **10 Claims**



1. In combination with an ignition distributor in the fuel ignition system of an internal combustion engine of the type having a housing, a cam operated contact point and an adjustable contact point, said adjustable contact point being provided with a slotted mounting plate and mounting screw extending therethrough to selectively lock the adjustable contact point in adjusted position whereby the gap and dwell characteristics of the points may be varied by adjusting the adjustable contact point in relation to the cam operated contact point, that improvement comprising actuating means operatively associated with the mounting screw and adjustable contact point to enable adjustment of the adjustable contact point without manipulation of the mounting screw, said actuating means including manually operable means accessible from the exterior of the distributor housing to enable adjustment of the adjustable contact point while the engine is operative, said manually operable means including a stationary bracket mounted on said mounting screw, a movable bracket mounted on said mounting screw alongside the stationary bracket, a rotatable screw threaded member interconnecting the stationary bracket and movable bracket for moving the movable bracket in relation to the stationary bracket, and means releaseably connecting the movable bracket to the adjustable contact point for moving the contact point therewith.

3,988,553

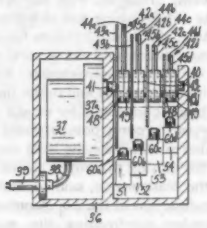
LIGHTING CONTROL

Thomas W. Astle, Orange, Conn., assignor to Michael J. Cozy, Waterbury, Conn.

Filed May 9, 1974, Ser. No. 468,420

Int. Cl.² H01H *43/00;* **F16H** *53/00;* **H01H** *9/00*

U.S. Cl. 200—38 BA **2 Claims**



1. An electrical circuit timing assembly comprising a housing member, a timing drive means including a shaft supported on said housing, a plurality of time indicating means on said

shaft each having a circular periphery and an axially extending hub, said indicating means being of progressively changing diameter, a camming member associated with each indicating means and normally in frictionally fixed relation with the hub thereof but angularly positionable thereon whereby each cammming member may be angularly positioned with respect to its associated indicating means, each of said camming members having a peripheral edge corresponding to a predetermined interval of time and a plurality of switches, each of said switches positioned on said housing to be actuated and held in an actuated position by a camming member of each indicating means, said drive means including shaft positioning means to permit said shaft and said indicating means thereon to be set to a given time position.

3,988,554

GAS-BLAST SWITCH

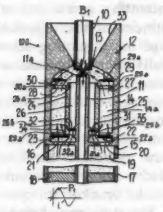
Rudolf Graf, Oberentfelden; Hans Heutschi, Kappel near Olten; Ernst Lang, Schlossrued; Viktor Stephanides, Zurich; Richard Thaler, Unterentfelden, and Hans-Rudolf Wüthrich, Oberentfelden, all of Switzerland, assignors to Sprecher & Schuh AG, Aarau, Switzerland

Filed July 7, 1975, Ser. No. 593,869

Claims priority, application Switzerland, July 29, 1974, 10363/74

Int. Cl.² H01H *33/88*

U.S. Cl. 200—148 A **6 Claims**



1. A gas-blast switch comprising a fixed contact, a movable contact, a blast nozzle surrounding one of the contacts, means defining a pump compartment for an extinguishing gas, said pump compartment having an outlet, said blast nozzle having a throat portion and an inlet, the inlet of the blast nozzle being connected with the outlet of the pump compartment, said pump compartment can be pressurized by the switching-off movement of the gas-blast switch, said throat portion of the blast nozzle being arranged, with respect to the direction of blowing of the extinguishing gas, downstream with regard to said one contact, check valve means for closing the outlet of the pump compartment, said check valve means closing in the direction of the pump compartment, means defining a gas chamber having inlet means and outlet means, the inlet of the blast nozzle being connected by means of the gas chamber with the outlet of the pump compartment, the outlet means of the gas chamber confronting the blast nozzle, a second check valve means for closing the outlet means of the gas chamber confronting the blast nozzle, said second check valve means closing in the direction of the gas chamber, the inlet means of the gas chamber confronting the pump compartment, throughpassage means emanating from the inlet of the blast nozzle and opening into the inlet means of the gas chamber, a third check valve means provided for said throughpassage means, said third check valve means opening in the direction of the inlet means of the gas chamber.

3,988,555

CAM OPERATED SWITCH

Dean Roosevelt Hooper, Jr., Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed June 20, 1975, Ser. No. 588,934

Int. Cl.² H01H *19/28*

U.S. Cl. 200—153 LB **9 Claims**

1. A switch which comprises:

a. a housing having an opening;

b. a pair of preloaded cantilever beams with each being positioned along an opposing side of the opening and adapted to bias the upper end inwardly toward the opening, each having at the upper end a contact tab extending inwardly toward the opposing contact tab, and further having at the lower end at least one depending pin adapted to be plugged into an electrical circuit or the like; and

c. cam means rotatably positioned in the opening between the cantilever beams and adapted to cam the contact tabs into or out of engagement.

3,988,556

SWITCHING APPARATUS

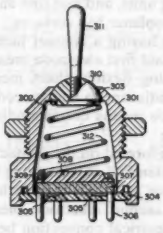
Masayoshi Hyodo, Aichi, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed June 19, 1974, Ser. No. 480,801

Claims priority, application Japan, June 21, 1973, 48-73867; June 21, 1973, 48-73868

Int. Cl.² H01H *1/02*

U.S. Cl. 200—264 **5 Claims**



1. A switching apparatus comprising a switch casing, an insulating holder fixed to said switch casing and having a plurality of terminals fixedly disposed therein, at least one contact element of elastomeric material of the type which becomes electrically conductive upon compression and disposed to be engageable with any one of said terminals, and

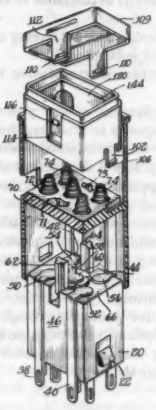
actuating means swingably disposed within said switch casing so as to impart a compressing force to said contact element thereby rendering said contact element electrically conductive, said actuating means including a swinging member capable of making swinging movement in a plurality of directions, said swinging member having a semi-spherical surface for engagement with an opening of mating shape provided in said switch casing.

3,988,557

LIGHTED PUSHBUTTON ELECTRICAL SWITCH ASSEMBLY

Richard C. Francke, Streamwood, and John A. Koepke, Des Plaines, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Jan. 27, 1975, Ser. No. 544,546
Int. Cl.² H01H 9/16
U.S. Cl. 200—314 **7 Claims**



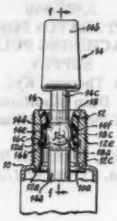
1. A lighted electrical pushbutton switch assembly suitable for either one light bulb or two light bulb operation comprising an outer housing having first and second open ends, a pushbutton illumination means received in said first open end of said outer housing emitter means for emitting viewing light therefrom, at least one electrical light bulb which is retained in said pushbutton illumination means, said pushbutton illumination means being constructed so that a single light bulb may be retained at a first position therein, or alternately so that second and third electrical light bulbs may be retained therein at second and third positions, respectively, first light contact means for making electrical connection with first terminals of whatever light bulbs are retained in said pushbutton illumination means, an electrical switching mechanism received in said second open end of said outer housing which comprises a depressible means for actuating said switching mechanisms, said pushbutton illumination means being movable with respect to said outer housing for actuation of said switching mechanism by depression of said depressible means, said switching mechanism having an outer housing having an exterior surface, second light contact means for making electrical connection with second terminals of whatever light bulbs are retained in said pushbutton illumination means comprising first, second and third contact pads on said exterior surface of said housing of said switching mechanism which are positioned so they may respectively make electrical connection with second terminals of first, second and third light bulbs, respectively; said first contact pad which makes electrical connection with said second terminal of said first light bulb, being electrically connected to one of said second and said third contact pads.

3,988,558

TOGGLE SWITCH HAVING AN EASILY ASSEMBLED, ANTI-ROTATION MOUNTING MEANS FOR ITS PIVOTAL TOGGLE LEVER

Leonardus J. Josemans, and James V. Johnson, Jr., both of Smithfield, N.C., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed May 28, 1975, Ser. No. 581,645
Int. Cl.² H01H 3/06
U.S. Cl. 200—335 **14 Claims**



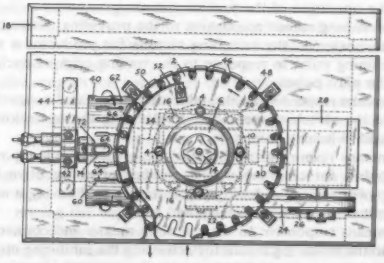
1. The combination of:
a pivotal actuating lever having a handle portion at one end, an actuating portion at its other end, and a pivotal portion therebetween, said pivotal portion having a pair of trunnions that extend in opposite directions;
a mounting member having a generally cylindrical bore;
easily assembled anti-rotation mounting means for said actuating lever comprising a pair of inserts embracing said pivotal portion of said lever, said inserts having holes for said trunnions and clearance allowing limited pivotal movement of said lever when said inserts and lever are inserted into said bore with an interference fit thereby to mount said actuating lever for limited pivotal movement in said mounting member;
and detent means retaining said inserts and lever within said bore.

3,988,559

MOBILE INDUCTORS FOR INDUCTION HEATING SYSTEMS

Pasquale Capolongo, Woodside, Queens, N.Y., assignor to Lepel High Frequency Laboratories, Inc., New York, N.Y.

Filed Apr. 24, 1975, Ser. No. 571,086
Int. Cl.² H05B 5/02
U.S. Cl. 219—10.43 **8 Claims**



1. Apparatus for feeding electrically conductive workpieces, one after another, through an induction heating zone and for induction heating portions of said workpieces while in said zone said apparatus including workpiece feeding means having uniformly spaced openings for receiving individual of said workpieces, means for moving said feeding means and said workpieces therein through a pre-selected path and

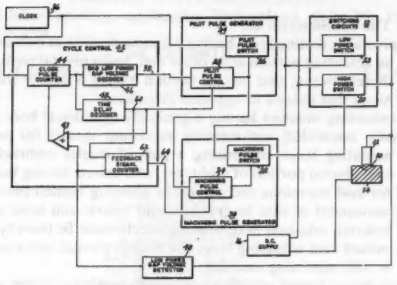
through an induction heating zone in said path, an induction coil mounted in fixed position in said induction heating zone and a drum mounted for rotation through said path, said zone and the induction field of said coil, said drum having a first opening in rotational alignment with said coil and a second opening interconnected with and spaced from said first opening for receiving the ends of said workpieces in said feeding means as said workpieces are moved through said preselected path and said drum is rotated through said path, said zone and said induction field of said coil.

3,988,560

METHOD AND APPARATUS FOR CONTROLLING GENERATION OF MACHINING PULSES IN EDM POWER SUPPLY

Jerry Earl Losey, Fort Thomas, Ky.; John Richard Witzel, Milford, and Harry Dean Kauffman, Cincinnati, both of Ohio, assignors to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Dec. 29, 1975, Ser. No. 645,255
Int. Cl.² B23P *1/08*
U.S. Cl. 219—69 C **3 Claims**



1. An EDM power supply comprised in part of a source of clock pulses defining ON and OFF times and power switching circuits being connected to a DC source and responsive to the clock pulses for producing during the ON times low power pulses and high power pulses across a machining gap in response to pilot pulses and machining pulses respectively, wherein the improvement comprises:

a. means responsive to each of the clock pulses and connected to the switching circuits for providing a pilot pulse in response to the leading edge of the ON time of the each of said clock pulses;

b. means connected to the providing means for inhibiting the operation of the providing means;

c. switching means responsive to the providing means and connected to the switching circuits for producing a machining pulse in response to the trailing edge of each of the pilot pulses;

d. means responsive to the inhibiting means and connected to the switching means for terminating the operation of said switching means;

e. means responsive to the clock pulses and the low power pulses for counting a first number of consecutive low power pulses producing gap voltage signal having a magnitude below a predetermined level;

f. means responsive to the counting means and connected to the inhibiting means for activating the inhibiting means in response to the first number of consecutive low power pulses thereby terminating the generation of the pilot pulses and the machining pulses;

g. means responsive to the counting means and connected to the inhibiting means for deactivating the inhibiting means after a predetermined period of time thereby allowing the generation of only pilot pulses to commence; and

h. means responsive to the low power pulses and the predetermined period of time and connected to the terminating means for deactivating the terminating means after the predetermined period of time in response to the occurrence of a second number of consecutive low power pulses producing a gap voltage signal having a magnitude equal to or exceeding the predetermined level thereby allowing the generation of the machining pulses to commence.

2. An EDM process for removing metal during the ON time of a clock pulse, said process having the steps of initiating a spark discharge across a machining gap, melting a volume of metal and terminating the spark discharge after a predetermined period of time commensurate with a predetermined energy level, the improvement comprising the steps of:

a. applying a low power pulse to the machining gap to produce a gap voltage signal in response to the leading edge of the ON time of a clock pulse;

b. applying a high power pulse to the machining gap in response to the trailing edge of the low power pulse;

c. iterating steps (a) and (b) in response to each of the clock pulses;

d. detecting a bad gap voltage signal having a magnitude less than a predetermined voltage level;

e. counting a first number of consecutive bad gap voltage signals;

f. terminating the application of low power pulses to the machining gap in response to counting the first number of consecutive bad gap voltage signals, whereby the application of high power pulses is also terminated;

g. commencing the application of only low power pulses after a predetermined period of time;

h. counting, in response to the application of only low power pulses, a second number of consecutive good gap voltage signals having a magnitude equal to or greater than the predetermined voltage level; and

i. iterating steps (d) through (g) until detecting the second number of consecutive good gap voltage signals;

j. commencing the application of high power pulses in response to counting the second number of consecutive good gap voltage signals.

3,988,561

WELD-BONDED TITANIUM STRUCTURES

Robert W. Vaughan, Manhattan Beach, and John F. Creedon, Santa Clara, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 2, 1975, Ser. No. 537,979
Int. Cl.² B23K *11/10, 11/18*
U.S. Cl. 219—92 **5 Claims**

1. A process for weld-bonding titanium comprising:

A. applying a polyimide prepolymer adhesive in a predetermined pattern to the surface of at least two titanium plates whereby areas to be spot-welded are void of said adhesive;

B. bringing said plates into contact with each other;

C. spot-welding to join said plates; and

D. heating said adhesive to effect cure of said adhesive and form a structurally strong weld-bonded layer.

3,988,562

ELECTRICAL RESISTANCE WELDING OF COATED SHEET METALS

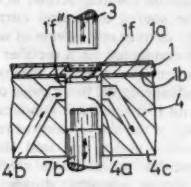
Otto Alfred Becker, Robert Koch Strasse 59, 66 Saarbruecken 6, Germany

Division of Ser. No. 208,963, Dec. 16, 1971, Pat. No. 3,805,013, which is a continuation-in-part of Ser. No. 869,668, Oct. 27, 1969, Pat. No. 3,629,544. This application Mar. 22, 1974, Ser. No. 453,780

Claims priority, application Germany, Oct. 26, 1968, 1805361; Nov. 7, 1968, 1807382; May 31, 1969, 1927915; Sept. 3, 1969, 1944614; Sept. 20, 1969, 1947771

Int. Cl.² B23K *11/10*

U.S. Cl. 219—93 4 Claims



1. Apparatus for the electrical resistance welding of coated sheet metals to each other, wherein for preserving the outer coating of said sheet metals undamaged the welding current is supplied to at least one of the coated sheets through the metal layer thereof and contact is established between blank areas of the sheet metals to be welded to each other, wherein the improvements comprise means for embossing a portion of at least one of said coated sheet metals in the region thereof to be welded, with the surface of said one coated sheet metal opposed to said embossed surface being unstripped, a die member having an opening the wall of which is positioned around said embossed portion of said sheet metal, a milling cutter guided for axial movement in said opening in said die member and thus centered relative to the surface of said embossed portion, said milling cutter cutting a recess in said embossed surface, with the dimension of said milling cutter relative to the dimension of said embossed surface being such that there remains an edge surrounding said recess to facilitate the welding operation when a lower coated sheet metal member, stripped in the welding area, is positioned below said embossed sheet metal member, said die member being formed with supply and drainage channels which intersect said opening for directing coolant to the surface being milled and subsequently to be welded, and removing chips formed during such milling operation, and means for supplying welding current to said sheet metals, such current passing from said one sheet metal to the other sheet metal through said edge of said embossed surface.

3,988,563

WELDING METHOD AND MEANS USING FOIL ELECTRODE

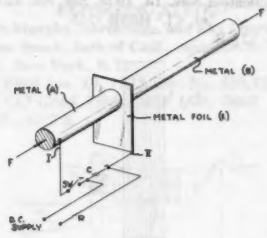
Robert Charles Swengel, Sr., Hellam, and J. A. Crumley, Mechanicsburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 305,192, Nov. 9, 1972, Pat. No. 3,891,789, which is a division of Ser. No. 55,614, July 16, 1970, Pat. No. 3,747,051, which is a continuation of Ser. No. 720,777, April 12, 1968, abandoned. This application Mar. 20, 1975, Ser. No. 560,069

Int. Cl.² B23K *11/04*

U.S. Cl. 219—104 23 Claims

8. A connecting method comprising the steps of placing together at least two metal members to be connected together with a thin conductive member disposed therebetween, applying a current of sufficient energy to cause an arc with at least one of said metal members being an electrode and with the thin member being an electrode and with said current causing



said thin member to vaporize in the zone adjacent said two members to melt said members and effect a fusion therebetween and bringing said members together to form a joint.

3,988,564

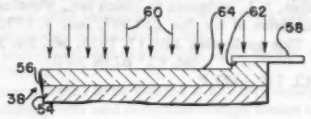
ION BEAM MICROMACHINING METHOD

Hugh L. Garvin, Malibu; Hayden M. Leedy, Thousand Oaks, and Richard S. Iwasaki, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 272,518, July 17, 1972, abandoned. This application June 14, 1974, Ser. No. 479,686

Int. Cl.² B23K *15/00*

U.S. Cl. 219—121 EM 3 Claims



1. A method for producing sharp-edged holes in electronic devices comprising the steps of:

holding a specimen with an epitaxial layer thereon in position by a tab placed over a portion of the specimen and the epitaxial layer;

directing an ion beam over the specimen and the epitaxial layer while shielding the portion of the epitaxial layer covered by the tab from the ion beam for machining exposed portions of the epitaxial layer and for thinning the epitaxial layer to a specified thickness;

measuring the amount of exposed epitaxial layer portions against the shielded epitaxial portion by means for determining the depth of the specimen portions machined by said directing step;

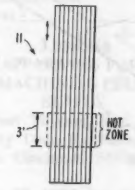
placing a mask substantially in contact on and with the thinned specimen, the mask having means therein for enabling subsequent production of the sharp-edged holes in the specimen; and

directing an ion beam at the specimen and the mask and through the mask means for removing portions of the specimen unprotected by the mask means by ions from the beam and thereby for producing the sharp-edged holes in the specimen.

3,988,565
NUCLEAR REACTOR FUEL ROD THERMAL SIMULATOR

Eugene F. Hill, Belmont, Calif., assignor to Varian Associates, Palo Alto, Calif.

Continuation of Ser. No. 368,559, June 11, 1973, abandoned. This application Nov. 14, 1974, Ser. No. 523,933
Int. Cl.² H05B 7/16
U.S. Cl. 219—121 R **14 Claims**

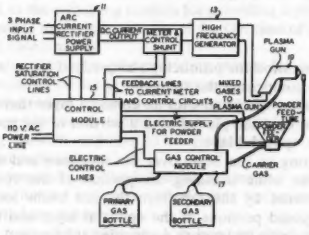


1. A nuclear reactor fuel rod simulator comprising:
an elongated tube,
a first hermetic sealing means disposed within said tube, remote from one end of said tube,
a second hermetic sealing means disposed within said tube between said first sealing means and the other end of said tube,
each of said sealing means being hermetically sealed to the inner surface of said tube,
said first and second sealing means being spaced apart to form a glow discharge space in a localized position along said tube, and
means for establishing a glow discharge in said glow discharge space and thereby heat said tube to nuclear reactor fuel rod operational temperature.

3,988,566
AUTOMATIC PLASMA FLAME SPRAYING PROCESS AND APPARATUS

William A. Vogts, Middle Village, N.Y., and Horace S. Daley, Clifton, N.J., assignors to Metco Inc., Westbury, N.Y.

Continuation of Ser. No. 259,987, June 5, 1972, abandoned. This application July 17, 1975, Ser. No. 596,771
Int. Cl.² B23K 5/00
U.S. Cl. 219—121 P **3 Claims**



1. In a plasma flame-spraying apparatus having a source of a primary plasma gas, a source of a secondary plasma gas, a first conduit from said source of primary gas and a second conduit from said secondary gas to a plasma flame-spraying nozzle, the plasma flame-spraying nozzle having a gas inlet, a gas outlet and a passage therethrough between said gas inlet and said gas outlet, an electrode of negative potential juxtaposed to said passage, the wall of said nozzle being an electrode of opposite potential, a source of electrical current in an electrical circuit containing said two electrodes of sufficient power to maintain an electrical arc between said electrodes within said passage, and means for feeding a material to be sprayed into gas passing through said nozzle or into gas passing out of said gas outlet, the improvement wherein:

A. said second conduit includes an electrically responsive valve means for increasing over a period of time the amount of secondary plasma gas flow through said second conduit and into said nozzle from a zero value to a predetermined final working value, said valve responsive to an electric signal such that when said valve is opened by said signal it allows progressively more secondary gas to pass therethrough and into said nozzle;

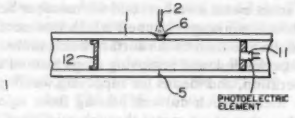
B. said electrodes in said electrical circuit electrically connected to means for increasing the current through said arc, said means for increasing current comprising a saturable reactor having a control winding, said reactor having electrically connected thereto a source of control current, a silicon control rectifier in the electrical circuit between the source of control current and the conrol winding, the current output side of said saturable reactor electrically connected via a rectifier to said electrode of negative potential, capacitor means in said circuit for gradually advancing the firing angle of said silicon control rectifier until it reaches full conduction with the saturation winding of the silicon control rectifier; and

C. said capacitor means and said electrically responsive valve responsive to the same electrical signal in said electrical circuit whereby, during start-up when said circuit is complete, said capacitor means allows increasing more conduction with the saturation winding of said saturable reactor as said electrically responsive valve allows increasingly greater amounts of secondary gas to flow to said nozzle such that the predetermined final full current and full secondary gas flow are reached within predetermined time limits.

3,988,567
METHOD OF DETECTING THE STATE OF FUSION OF THE WORKPIECE IN WELDING

Akira Okada, and Michio Inagaki, both of Tokyo, Japan, assignors to National Research Institute for Metals, Tokyo, Japan

Filed Mar. 25, 1975, Ser. No. 561,974
Claims priority, application Japan, Mar. 30, 1974, 49-35175
Int. Cl.² B23K 9/10
U.S. Cl. 219—137 R **11 Claims**



1. In welding a workpiece from one side using arc or electron beam welding, a method of detecting the state of fusion of the workpiece which comprises:

A. superposing on an arc or electron beam welding current a signal current selected from the group consisting of a positive and negative pulse current and a sinusoidal current, to vary the heat input applied to the workpiece at the point where the welding current is applied;

B. measuring the energy change at the side of the workpiece opposite the point where the welding and signal currents are applied, said change resulting from the heat input of the signal current; and

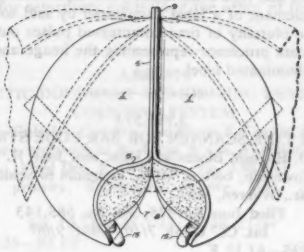
C. determining the state of fusion of the weld by comparing both the phase difference between the signal current input and the measured energy change, and the waveform of the signal current input with the waveform of the measured energy change.

3,988,568

HEATED HEAD ENCLOSURE

Jo Marie Mantell, 6201 - 63 Shoup, Woodland Hills, Calif. 91364

Filed Aug. 22, 1975, Ser. No. 606,797
Int. Cl.² H05B 1/00
U.S. Cl. 219—211 8 Claims



1. A head enclosure for applying heat to the head of a customer undergoing hair treatment, comprising:

a. a pair of complementary cover members adapted to conform approximately to opposite sides of the customer's head and having front margins defining an opening for exposing the face of the customer;

b. each cover member having a top margin adapted to extend from the back of the neck over the crown of the head to the forehead of the customer;

c. a continuous non-conductive separable fastener band extending along each top margin on the inner face of each, the bands being continuously engageable lengthwise to minimize escape of heat from the cover members, and mutually, engageable a variable transverse extent to change the effective size of the cover members;

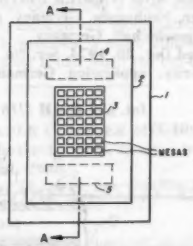
d. and heating elements distributed within each cover member.

3,988,569

THERMAL PRINTHEAD WITH MEMORY

W. S. Henrion, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 16, 1974, Ser. No. 533,427
Int. Cl.² H05B 1/00
U.S. Cl. 219—216 7 Claims



1. In a thermal printhead which comprises a plurality of semiconductor mesas, each responsive to at least one input signal for generating a hot-spot at a surface thereof, the improvement comprising:

a. heater means in each of said mesas for converting electrical energy to heat energy to form a hot-spot, and

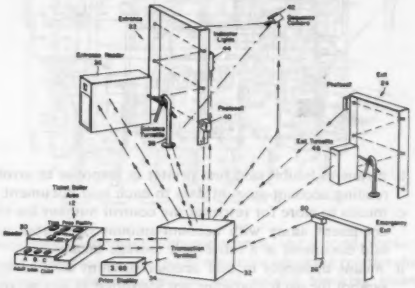
b. latching means in each of said mesas, operatively connected to said at least one input signal for energizing said heater means in response to preselected levels of said at least one input signal, and for maintaining said heater means in an energized state despite subsequent changes in the levels of said at least one input signal.

3,988,570

CONTROLLED ACCESS AND AUTOMATIC REVENUE REPORTING SYSTEM

Arthur John Murphy, Northridge, and Ray Charles Maddocks, Capistrano Beach, both of Calif., assignors to Endyn Industries Ltd., New York, N.Y.

Filed Jan. 10, 1975, Ser. No. 539,936
Int. Cl.² G06K 7/08; G07F 1/06; G06F 15/20
U.S. Cl. 235—61.7 R 13 Claims



1. A ticket dispensing and accounting system for remotely monitoring in real time all revenue transactions and passage of patrons through an amusement area comprising,

computer storage means under control of a sales agent for recording accounting information such as number of tickets sold and issued, time, price, point of sale and sales agent,

a selectable ticket under control of said sales agent and adapted to have magnetically encoded information written onto and read from said ticket,

ticket reading and writing means under control of said sales agent for encoding magnetic information from said computer storage means onto said ticket,

means for issuing encoded tickets only upon receipt of the proper revenue,

reading means adapted to be located at an entry station and communicating with said computer storage means in real time for reading said magnetically encoded tickets,

means responsive to selected encoded information on said ticket for independently verifying the patron seeking entry and the ticket being used,

means for generating an entry signal in response to a comparison between a portion of said information in said computer storage means and information encoded on said ticket, and

means for interrogating and reading recorded information in said computer storage means at remote locations on a timed basis whereby a running check on revenue and passage of patrons can be made on a real time basis.

3,988,571

DOCUMENT REJECT REENTRY

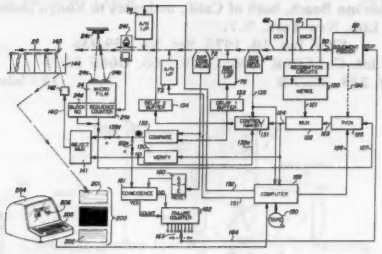
James F. Blair, Dallas; Patricia L. Korn, Addison, and Leonard J. Nunley, Dallas, all of Tex., assignors to Recognition Equipment Incorporated, Irving, Tex.

Filed May 30, 1974, Ser. No. 474,525
Int. Cl.² G01D 15/18; G06K 7/10
U.S. Cl. 235—61.9 R 12 Claims

1. In a document sorter-processor where a high speed transport moves a train of documents through an alphanumeric character reader means and a first ink jet printer to addresses in a family of destinations selected on the basis of data read

from each said document by said reader means and wherein means connected between said reader means and said printer actuates said printer to imprint on each said document a bar coded representation of signals from said reader means along with one unique positive item control number from a sequentially ordered set of numbers, the combination comprising:

a. a second ink jet printer through which said train passes to print data on the faces of said documents,



b. means to inhibit said first printer in response to error in reading account-amount data to each said document,

c. means to store for retrieval the control number for each document along with account-amount data from each said document in a retrievable storage means,

d. means to supply in said account-amount data an error symbol for each character not identified in any account-amount field, and

e. means to correct said symbol in storage.

3,988,572

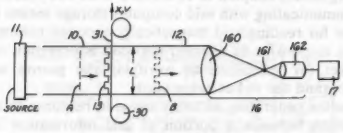
SYNTHETIC APERTURE SYSTEM FOR INFORMATION TRANSFER AND OBJECT IDENTIFICATION

James Nickolas Constant, 1603 Danbury Drive, Claremont, Calif. 91711

Continuation-in-part of Ser. No. 445,358, Feb. 25, 1974, which is a continuation-in-part of Ser. No. 321,646, Jan. 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 209,048, Dec. 17, 1971, abandoned. This application Mar. 27, 1975, Ser. No. 562,637

Int. Cl.² G06K 7/10; G02B 27/38

U.S. Cl. 235—61.11 E **4 Claims**



1. In a system for information transfer and object identification, the combination of:

a plurality of labels with a label for each object to be identified, with each label having resolution elements forming a code for identifying the object;

means for moving said labels through a zone; and

a coherent optical system including a source, a detector, and a data processor,

said source including means for directing light output to said zone where a label moves relative to said source and detector, with the resolution elements of a label at said zone illuminated by said source for providing signals from said elements to said detector, said source further including means for directing light output to said detector for providing a reference signal from said source to said detector,

said detector including aperture means for receiving signals from said illuminated resolution elements and reference signal at the detector input and providing chirp signals at the detector output for each resolution element illuminated, with said chirp signal representing the detected beat signal of a signal from an illuminated resolution element and said reference signal, and

said data processor having the detector output chirp signals as an input and providing as an output a time compressed pulse for each chirp signal appearing at its input,

with each said time compressed pulse representing a resolution element of a label illuminated by said source, and with a plurality of time compressed pulses output from said data processor representing the image and code of said illuminated label.

3,988,573

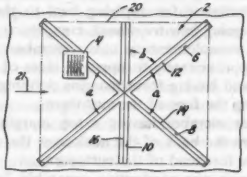
THREE LINE SCANNER FOR BAR CODE SYMBOLS

Thomas D. Hayosh, Bloomfield Hills, and John H. Carosella, Avon Township, both of Mich., assignors to Schiller Industries, Inc., Warren, Mich.

Filed June 9, 1975, Ser. No. 585,143

Int. Cl.² G06K 7/10; G08C 9/06

U.S. Cl. 235—61.11 E **15 Claims**



1. An optical scanner for reading bar code symbols, said scanner comprising a light beam source, beam deflection means in the path of the light beam from said source, said beam deflection means being operative to deflect said beam about a deflection axis and to tilt said deflection axis from one deflection plane to another after each beam deflection to produce three trace segments in three separate deflection planes, and trace segment orienting means in each of said deflection planes for redirecting the beam into a scanning field to produce three nonparallel trace segments on a surface in the scanning field.

3,988,574

COMBINED SWITCH HOUSING FOR WINDSHIELD WIPER AND WASHER INSTALLATION

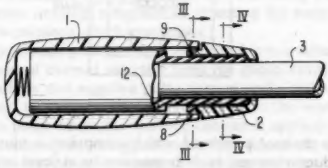
Karl Peitsmeier, Neuhausen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Dec. 20, 1974, Ser. No. 534,788

Claims priority, application Germany, Dec. 22, 1973, 2364278

Int. Cl.² H01H 3/16

U.S. Cl. 200—61.27 **12 Claims**



1. A combination switch housing for a windshield wiper and washer installation of a motor vehicle having a multi-stage windshield wiper system and a windshield washer system with conventional switch means to control both the wiper system and the washer system, characterized in that an electrically

insulating member which contains the conventional switch means is disposed in the switch housing which consists of an upper housing portion and a lower housing portion operatively connected together such that the upper housing portion is rotatable with respect to the lower housing portion for selectively controlling one of the two systems while the upper housing portion is axially displaceable together with the lower housing portion with respect to the electrically insulating member for selectively controlling the other of the two systems.

3,988,575

MAGNETIC-DOUGHNUT MEMORIZING DEVICE FOR COUNTING SYSTEM

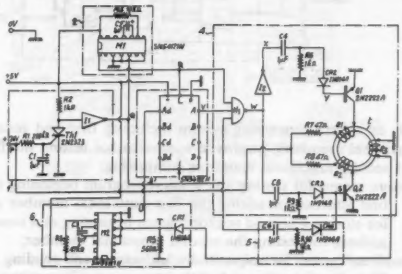
Jacques A. Guimier, Courtry, and Pierre F. Coutin, Paris, both of France, assignors to R. Alkan & Cie, Valenton, France

Filed Dec. 5, 1974, Ser. No. 530,033

Claims priority, application France, Dec. 13, 1974, 74.44778

Int. Cl.² G06M *3/12*; H03K *21/34*

U.S. Cl. 235—92 FP **1 Claim**



1. Device for memorizing the position of a counting system in case of failure or cut-off in the supply current, comprising a counter consisting of counting decades constituted by intergrated circuits, magnetic doughnuts each associated with an output of said counter, a pair of windings associated with each magnetic doughnut, a source of current, said pair of windings being supplied with current from said source under the control of the associated counter output so as to assume one or the other of two states according to the momentary state of the associated counter output, a monostable flip-flop, each magnetic doughnut further comprising a third winding delivering or not to said counter through said monostable flip-flop, when the supply current is restored, a pulse utilized for restoring said counter to the state it had when the cut-off took place.

3,988,576

PRESETTABLE COUNTER MECHANISM

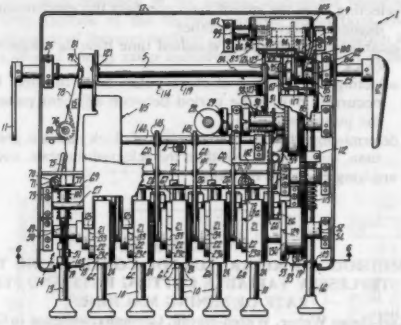
Bruno S. Smilgys, Hartford, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.

Filed May 12, 1975, Ser. No. 576,241

Int. Cl.² G06C *15/42*

U.S. Cl. 235—144 DM **8 Claims**

1. In a presettable counter operated control mechanism having a plurality of indicating counter wheels including a first lower order driven wheel and a plurality of successive higher order wheels, each of said wheels being rotatable through a plurality of indicating positions, transfer means releasably connecting each said counter wheel to a next higher order wheel whereby the wheels are interconnected for sequential operation, a plurality of devices actuable for individually setting said wheels to any of their positions of rotation relative to an indicating reference position, a control member, said control member actuable to a loaded position and coupled to the wheels for release and movement to a rest position in response to a reference indication of the counter wheels, the improvement in the counter mechanism comprising: first blocking means positioned in actuation blocking relationship with said wheel setting devices, conditioning means selectively actuable for relatively moving said wheel setting devices out of said actuation blocking relationship with said first blocking means and for releasing said transfer means from said inter-



connecting relationship with said wheels, and second blocking means movable into and out of actuation blocking relationship with said conditioning means, said second blocking means operatively coupled to said control member for blocking said actuation of said conditioning means when the control member is actuated to said loaded position and for allowing said actuation of said conditioning means when the control member is released to said rest position.

3,988,577

AUTOMATED ENERGY SYSTEMS WITH COMPUTER COMPATIBILITY

Frank Wilhite Leitner; Walter Louis Baker, III, both of Charlotte; Jeter Olive Barker, Jr., Matthews, all of N.C., and Jorgen Walther Andersen, Silver Spring, Md., assignors to Automated Energy Systems, Inc., Matthews, N.C.

Continuation of Ser. No. 243,952, April 14, 1972, abandoned. This application Feb. 24, 1975, Ser. No. 552,338

Int. Cl.² G05D *23/19*

U.S. Cl. 235—151.1 **36 Claims**

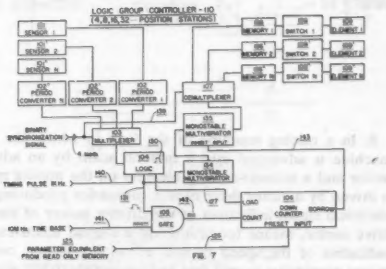


FIG. 7

1. A method for supervising energy systems in ON/OFF fashion by controlling the energy application to maintain a desired energy level comprising the steps of:

predetermining the desired energy level by establishing it as a number;

sensing the actual energy level of the system by exposing a variable output sensor means thereto for output variation in accordance with the sensed energy level;

converting the variable output to an adjustable pulse train with the time period between pulses being proportional to the energy level being sensed;

storing numbers having values in accordance with the ratios of sensor output variable values at the energy levels to be sensed to the sensor output value at a reference energy level, with said ration numbers being retrievable respectively against the desired energy level number;

selecting from the stored ratio numbers the predetermined desired energy level number;

establishing a reference standard time base as a source of clock pulses;

selecting that number of clock pulses from the time base occurring during the period between adjacent pulses of the pulse train;

determining if the selected number of clock pulses is greater than, equal to, or less than the selected number; and,

applying energy if required.

3,988,578

METHOD AND APPARATUS FOR CONTROLLING THE STEPLESSLY VARIABLE CUTTING RATE AND FEED RATE OF MINING MACHINES

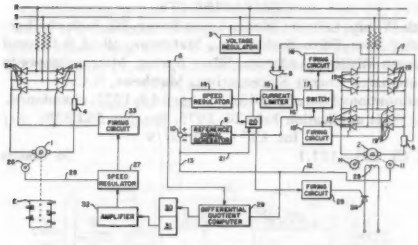
Karl-Heinz Weber, Witten-Heven, Germany, assignor to Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H., Bochum, Germany

Filed June 2, 1975, Ser. No. 583,038

Claims priority, application Germany, June 4, 1974, 2426815

Int. Cl.[2] B23Q 5/28; G06G 7/66

U.S. Cl. 235—151.1 **12 Claims**



8. In a mining machine of the type in which the mining machine is advanced into a mineral seam by an advancing motor and a mineral-cutting element on the mining machine is driven by a cutter drive motor, means for producing a first electrical signal indicative of the driving power of the cutter drive motor, means for producing a second electrical signal indicative of the speed of said advancing motor, computer means responsive to said first and second electrical signals for producing an output signal proportional to:

$$\frac{d\,(N_{Wa})}{d\,(V_{Wi})^2}$$

where N_{Wa} is the driving power of the cutter drive motor and V_{Wi} is the speed of said advancing motor, and means responsive to said output signal for controlling at least one of said motors in a manner to minimize said output signal.

3,988,579

SYSTEM FOR TESTING A DATA PROCESSING UNIT

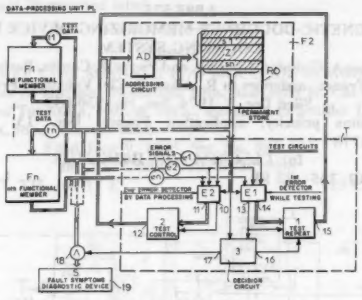
Gilles Jean Marcel Bottard, Paris, and Marcel Rene Rottier, Rosny, Bois, both of France, assignors to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Filed May 21, 1974, Ser. No. 471,928

Claims priority, application France, May 28, 1973, 73.19329

Int. Cl.[2] G06F 11/04

U.S. Cl. 235—153 AK **7 Claims**



1. In a data processing system including first and second functional members, improved apparatus for testing the first and second functional members comprising:

store means for storing a first microprogram beginning at a first address for testing the first functional member and for storing a second microprogram beginning at a second address for testing the second functional member;

address means for sequentially addressing and reading the first microprogram out of the store means in response to the first address, and for sequentially addressing and reading the second microprogram out of the store means in response to the second address;

means for conducting the microinstructions to the first and second functional members as the microinstructions are read out of the store means so that symptom signals are produced by either one of the first and second functional means which is defective;

validating means for generating a first control signal when all symptom signals needed to diagnose a defective one of the first and second functional members are available and for generating a second control signal when any symptom signal needed to diagnose a defective one of the first and second functional members is missing;

first error detector means connected to the first and second functional members and operative during the testing of the first and second functional members for generating a first indicating signal which identifies a defective one of the first and second functional members;

first circuit means responsive to the first indicating signal and the second control signal for transmitting the first address to the address means if the first indicating signal indicates that the first functional member is defective and for transmitting the second address to the address means if the first indicating signal indicates that the second functional member is defective, so that the defective functional member is tested again if any symptom signal needed to diagnose the defective functional member is missing;

second error detector means connected to the first and second functional members and operative during data processing by the data processing system for generating a second indicating signal which identifies a defective one of the first and second functional members;

second circuit means responsive to the second indicating signal for transmitting the first address to the address

means if the second indicating signal indicates that the first functional member is defective and for transmitting the second address to the address means if the second indicating signal indicates that the second functional member is defective, so that a test of the defective functional member will be initiated; and

means for transmitting the symptom signals to a diagnostic device in response to the first control signal.

3,988,580
STORAGE OF INFORMATION

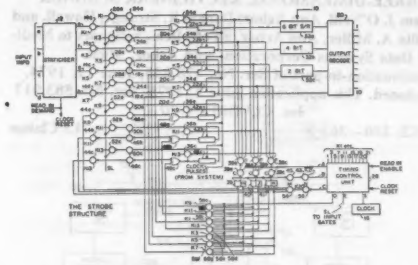
Bloomfield James Warman, Wandsworth, and Stephen Sidney Walker, Kent, both of England, assignors to GTE International Incorporated, Stamford, Conn.

Filed June 12, 1975, Ser. No. 586,468

Claims priority, application United Kingdom, July 10, 1974, 30641/74

Int. Cl.² G11C *29/00;* **H03K** *13/34*

U.S. Cl. 235—153 AM **14 Claims**



1. A store for storing information in the form of a binary word, comprising means for applying the bits of a binary coded word to the inputs of respective ones of a first plurality of reiterative digital stores in a predetermined time sequence, logic means for receiving the binary coded word bits, means for coupling the word bits to the logic means substantially at the same time and in the same sequence as they are entered into their respective stores, a second plurality of reiterative digital stores, said logic means comprising a plurality x of bistable devices each coupled to receive a different group x of word bits out of y word bits where y and x are the number of the first and second plurality of reiterative stores respectively and arranged to generate a parity bit according to the sum of the word bits received, and the output of each bistable device is coupled to a respective one of the second plurality of reiterative stores, in a predetermined time sequence and means for causing the word and parity bits to traverse their respective stores in the same said sequences.

3,988,581
RADIOACTIVE WELL LOGGING SYSTEM WITH SHALE (BORON) COMPENSATION BY GAMMA RAY BUILD-UP

Harold E. Peelman; Dan M. Arnold, and Robert W. Pitts, Jr., all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,786

Int. Cl.² G01V *5/00*

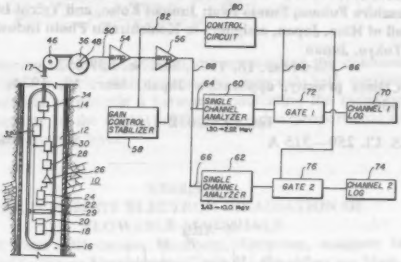
U.S. Cl. 250—270 **11 Claims**

1. A method of radioactivity well logging to evaluate the relative presence of salt water and hydrocarbons from measurements in subsurface earth formations in the vicinity of a well borehole, with compensation for the effects of boron in shaly formations on the measurements, comprising the steps of:

a. emitting in a borehole at repeated intervals discrete bursts of high energy neutrons from a logging instrument having a neutron source and a radiation detector to bombard the earth formations and produce a succession of thermal neutron populations in the borehole and formations;

b. detecting radiation at the logging instrument resulting from capture of the thermal neutron populations and emission of thermal neutron capture gamma radiation in a first energy range including a significant part of the neutron capture gamma spectrum of hydrogen;

c. detecting radiation at the logging instrument resulting from capture of the thermal neutron populations and emission of thermal neutron capture gamma radiation in a second energy range including a significant part of the



neutron capture gamma spectrum of chlorine which is distinct from that of hydrogen;

d. deriving from the radiation detected in the first and second energy ranges a measure of the relative presence of salt water and hydrocarbons in the formations; and

e. controlling said step of emitting so that each of the repeated bursts of neutrons is emitted at a boron compensation rate so that the presence of boron in the formations does not cause the derived measure of relative presence of salt water and hydrocarbons to erroneously indicate increased salinity, wherein compensation is made for the effects of boron on the measurements.

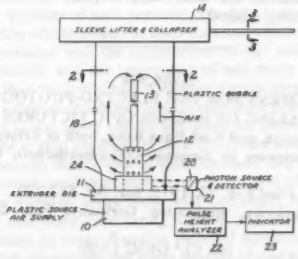
3,988,582
BLOWN FILM THICKNESS GAUGE

Randall W. Harman, San Juan Capistrano, Calif., assignor to Nucleonic Data Systems, Inc., Irvine, Calif.

Filed Aug. 28, 1975, Ser. No. 608,519

Int. Cl.² G01N *23/20*

U.S. Cl. 250—272 **18 Claims**



1. In a thickness gauge for a blown film machine having a plastic extruder with a die for extruding an elongate plastic bubble, an air system for supplying air under pressure to the interior of the bubble, and a bubble collector receiving the bubble, the combination of:

a metal member;

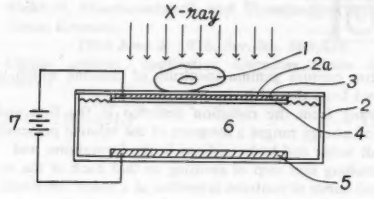
means for mounting said member adjacent said die and within and spaced from said bubble;
a source of x-ray photons;
a radiation detector; and
means for mounting said source and detector outside and spaced from said film for directing photons from said source through said film to said member and receiving photons from said member, with the radiation intensity at said detector being a function of the thickness of said film.

3,988,583

ELECTROSTATIC IMAGING PROCESS USING X-RAYS

Masahiro Fukase; Fumio Iwai; Junichi Koiso, and Yoichi Ishii, all of Hino, Japan, assignors to Konishiroku Photo Industry, Tokyo, Japan

Filed Mar. 18, 1975, Ser. No. 559,652
Claims priority, application Japan, Mar. 19, 1974, 49-31669
Int. Cl.² G03B 41/16
U.S. Cl. 250—315 A 6 Claims



1. A process of producing an electrostatic photographic image by means of a radio-active ray, comprising the steps of applying a voltage across two electrodes disposed in opposed parallel relationship, one of said electrodes having a layer of an insulating material on the side thereof facing the other electrode, the space between said insulating layer and said other electrode being filled with an electron- or ion-emitting substance, permitting electrons or ions to generate from said substance by subjecting the latter to imagewise exposure with X-rays, allowing the electrons or ions to be adsorbed on the surface of the insulating layer to form an electrostatic latent image, and then developing said latent image with ionized toner to visualize the same, said electron- or ion-emitting substance being a liquid.

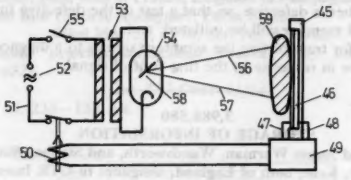
3,988,584

ARRANGEMENT FOR THE ELECTRO-PHOTOGRAPHIC TAKING OF RADIOSCOPIC PICTURES

Gottfried Lange, and Karl Hans Reiss, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Feb. 25, 1975, Ser. No. 552,779
Claims priority, application Germany, Feb. 28, 1974, 2409712
Int. Cl.² G03G 15/00
U.S. Cl. 250—315 A 2 Claims

2. In an arrangement for the electro-photographic taking of radioscopic pictures, including an electrically insulating exposure layer; and support means for retaining said exposure layer in the path of the transilluminating rays, the improvement comprising: a plurality of mutually insulated, electrically conductive layers on said support means, said electrically conductive layers comprising carbon coatings, said exposure layer being located between said electrically conductive layers; and



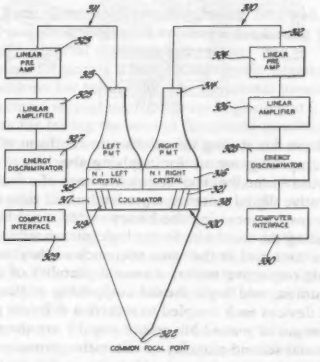
means for controlling the source of the penetrating rays, said electrically conductive layers being connected to said source.

3,988,585

THREE-DIMENSIONAL RECTILINEAR SCANNER

William J. O'Neill, Ann Arbor; Donald R. Strange, Howell, and Philip A. Miller, Ann Arbor, all of Mich., assignors to Medical Data Systems Corporation, Ann Arbor, Mich.

Continuation-in-part of Ser. No. 478,233, June 11, 1974, abandoned. This application June 5, 1975, Ser. No. 583,917
Int. Cl.² G01T 1/20
U.S. Cl. 250—363 S 13 Claims



1. In a tomographic gamma ray imaging device for detecting radiation dispersed within or transmitted through a patient and displaying an illustration of such distribution, the improvements comprising:
a head traversing the patient;
said head having a collimator;
a plurality of crystal members mounted on top of said collimator within said head;
said collimator comprising a lead shield relatively impervious to the passage of gamma radiation;
arrays of apertures within said collimator allowing the conduction of gamma radiation through said apertures;
each of said apertures having a focal axis directed towards a point below said collimator;
said point lying on the focal axes of all of said apertures;
said point lying within a focal plane from which radiation is detected by said head through said apertures in said collimator;
each of said crystal members responding electromagnetically to radiation from a different one of the arrays of apertures in said collimator;
each of said crystal members responding to radiation simultaneously to each of the other crystal members responding to radiation;

each of said focal axes of said apertures intercepting with one another and being at acute angles with respect to each other;

said head passing over a source of radiation in such a manner that electromagnetic response from one of said crystal members is discrete from and chronologically displaced from an electromagnetic response of another one of said crystal members.

3,988,586

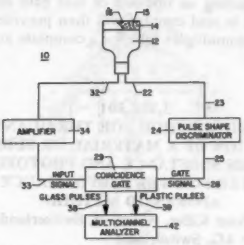
COMBINATION NEUTRON-GAMMA RAY DETECTOR

Travis P. Stuart, and Wilbur J. Tipton, both of Las Vegas, Nev., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 24, 1975, Ser. No. 589,807

Int. Cl.² G01T *1/20*

U.S. Cl. 250—367 **12 Claims**



1. In a system for detecting combined neutron and gamma radiation and distinguishing therebetween, the method comprising:

a. Providing a detector for a single photomultiplier, which detector includes a first phosphor material which scintillates primarily in response to neutron radiation and a second phosphor material which scintillates primarily in response to gamma radiation,

b. Utilizing a distinguishing characteristic of the scintillations of said first and second phosphors to produce a signal in response to scintillations of one of said phosphors and

c. Manipulating an output selection means into which an output of the photomultiplier has been introduced as an input by said signal to produce an output from said output selection means corresponding to the scintillations of said one phosphor.

3,988,587

METHOD AND APPARATUS FOR INDICATING THE RADIOACTIVE DECAY PRODUCTS OF RADIUM IN AN ENVIRONMENT

James D. Shreve, Jr., Edmond; Larry S. Trowsdale, Oklahoma City, both of Okla., and Adare Hill, Uravan, Colo., assignors to Kerr-McGee Nuclear Corporation, Oklahoma City, Okla.

Filed Apr. 14, 1975, Ser. No. 567,878

Int. Cl.² G01T *1/20, 7/02*

U.S. Cl. 250—364 **40 Claims**

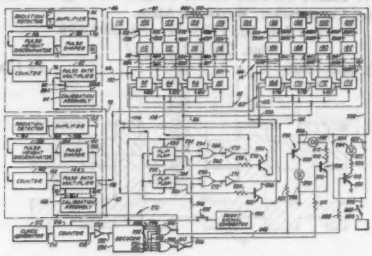
1. A method for providing indications of the radiation activity of radon and the decay products of radon, the method comprising the steps of:

detecting the alpha particle activity occurring as a result of the radiation emissions of the decay products of radon;

providing an output indication representing the detected alpha particle activity;

detecting the beta particle activity occurring as a result of the radiation emissions of the decay products of radon;

providing an output indication representing the detected beta particle activity; and



summing the output indications representing the detected alpha particle activity and the detected beta particle activity to provide a parameter indicating the radiation activity of the decay products of radon proportional to the working level.

3,988,588

HIGH ENERGY ELECTRON IRRADIATION OF FLOWABLE MATERIALS

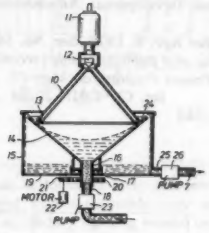
Bernd Peter Offermann, Hamburg, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Division of Ser. No. 419,543, Nov. 28, 1973, Pat. No. 3,891,855. This application May 16, 1975, Ser. No. 578,251

Claims priority, application Germany, Nov. 29, 1972, 2258393

Int. Cl.² H01J *37/06*

U.S. Cl. 250—492 B **6 Claims**

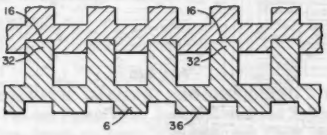


1. Apparatus for irradiating a flowable material with high energy electrons, comprising, in combination: a container for holding a quantity of such material; a hollow body of circular cross section which is open at both ends and which is disposed in said container with the longitudinal axis of said body oriented vertically and the upper end of said body at a lower elevation than the top of said container; means supporting said body for rotation about its vertical axis; inlet conduit means connected to the lower end of said body for delivering material into the region enclosed by said body, said conduit means passing through the bottom of said container in a liquid-tight manner; outlet conduit means connected to said container for conveying material away from said container; means connected to said body for rotating it about its vertical axis at a rate sufficient to cause flowable material introduced by said inlet conduit means into the lower portion of said body to flow upwardly along the inner wall surface of said body under the influence of centrifugal force and to flow over the upper edge of said body and into said container; and irradiation means disposed for irradiating such material with high energy radiation as the material flows up said inner wall surface of said body.

3,988,589
METHODS OF COLLIMATOR FABRICATION

John W. Leask, Carlisle, Mass., assignor to Engineering Dynamics Corporation, Westford, Mass.

Filed July 28, 1975, Ser. No. 599,599
Int. Cl.² G21F 5/02
U.S. Cl. 250—505 14 Claims



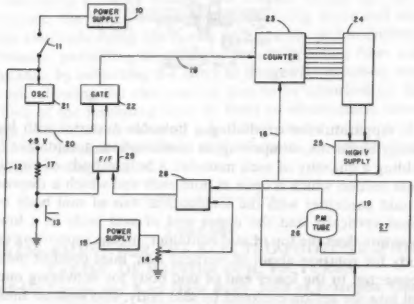
1. A method for producing a collimator suitable for forming an image upon a radiation sensitive member of a radiation receiver of a radioactive object, which method comprises the steps of:

casting a plurality of modular elements of material opaque to radiation from said radioactive object, each said modular element comprising a substantially flat base having a plurality of elongated ridges on one side thereof so as to form elongated channels therebetween, the opposite side thereof having grooves adapted to receive corresponding ridges of a neighboring module in a modified mortis-tenon relationship, and inserting and affixing the ridges of each module into the grooves of its neighbor.

3,988,590
PHOTOMULTIPLIER TUBE GAIN REGULATING SYSTEM

Wayne F. Johnson, Loudon, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 8, 1975, Ser. No. 566,572
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² G01N 21/24
U.S. Cl. 250—564 4 Claims

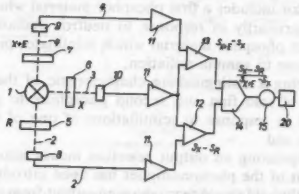


1. In an analytical photometer device including a multicuvette rotor provided with a plurality of cuvettes for receiving respective samples and reagents thereinto for mixing and reacting, means for rotating said rotor at a desired selected high speed, a stationary photometer system for scanning all of said cuvettes during rotation of said rotor, and a read-out device connected to the output of said photometer system for evaluating the signal received from each of said cuvettes during operation of said system, said photometer system including a photomultiplier tube, the improvement comprising control circuitry for setting the gain on said photomultiplier tube comprising an oscillator, a 10 bit binary counter, a gate connected between said oscillator and said counter, a digital-to-analog converter coupled to the output of said counter, a DC-DC high voltage supply coupled to the output of said converter, said converter providing a DC output to said high voltage supply in direct proportion to the size of the input from said counter, the output of said high voltage supply coupled to the input of said photomultiplier tube, a comparator, an adjustable reference voltage coupled as one input to said comparator, the output of said photomultiplier tube coupled as a second input to said comparator, a set-reset flip-flop, the output of said comparator coupled as one input to said flip-flop, a start switch, a positively biased resistor coupled as a second input to said flip-flop, said start switch when closed connecting said resistor to ground, the output of said flip-flop coupled to said gate such that when said start switch is closed said flip-flop effects the closing of said gate to permit impulses from said oscillator to pass to said binary counter, whereby when the output voltage from said photomultiplier tube is equal to or greater than said reference voltage as sensed by said comparator then said comparator provides a signal to said flip-flop for effecting an opening of said gate such that the impulses stored in said counter will then provide a constant gain to said photomultipler tube for a complete analytical run of said analyzer.

3,988,591
PHOTOMETRIC METHOD FOR THE QUANTITATIVE DETERMINATION OF A MATERIAL OR SUBSTANCE IN AN ANALYSIS SUBSTANCE AND PHOTOELECTRIC PHOTOMETER FOR THE PERFORMANCE OF THE AFORESAID METHOD

Walter Heinz Peter Killer, Allschwil, Switzerland, assignor to Dr. W. Killer AG, Switzerland

Filed June 2, 1975, Ser. No. 583,341
Claims priority, application Switzerland, June 10, 1974, 7890/74
Int. Cl.² G01N 21/24
U.S. Cl. 250—565 11 Claims



1. A photometric method for the quantitative determination of a substance in an analysis substance, wherein the course of the calibration curve representative of the functional dependency of an optical measurement magnitude upon the construction of the substance can be determined by at most a few parameters, comprising the steps of: providing a reference sample for a calibration curve parameter, said reference sample containing the substance to be analyzed in a known concentration wherein said concentration may be zero or greater, removing from the analysis substance a partial quantity to serve as an analysis sample, and producing from further partial quantities of the analysis substance at least one calibration sample of a different concentration than the reference sample, the calibration samples produced corresponding to the number of further calibration curve parameters by the addition of predetermined graduated quantities of the substance to be analyzed to the partial quantities of the analysis substance whereby the calibration samples have a higher concentration of the substance to be analyzed than the reference sample, each calibration sample thereby containing the substance to be analyzed in a concentration which is composed of the unknown proportion and a known proportion, illuminating the

analysis sample, the reference sample and the calibration sample (s), and at least approximately simultaneously determining for all samples the values of the optical MEASUREMENT magnitudes, and mathematically determining the concentration of the substance in the analysis sample from the course of the calibration curve determined by the measurement magnitude values and the known concentration of the substance to be analyzed in the reference sample.

3,988,592

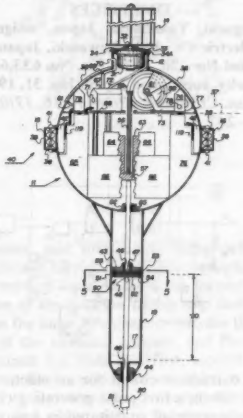
ELECTRICAL GENERATING SYSTEM

William H. Porter, 355 Westbourne St., La Jolla, Calif. 92037

Filed Nov. 14, 1974, Ser. No. 523,579

Int. Cl.² F03B *13/12*

U.S. Cl. 290—53 **6 Claims**



1. An electrical generating system disposed in tidal waters comprising:

a hermetically sealed flotation sphere having a predetermined buoyancy for exposing an upper portion of the sphere's surface area above the water line of an aqueous medium in which it is disposed;

a drive pipe slidably received by said flotation sphere, said drive pipe being coupled to an anchor means at the bottom of said aqueous medium;

a plurality of drive screw assemblies vertically disposed around the periphery of said flotation sphere beneath said water line, said drive screw assemblies being substantially tangential to said flotation sphere; and

first electrical generating means carried within said flotation sphere and coupled to said drive screws.

3,988,593

NONLINEAR AMPLIFYING

C. Forbes Dewey, Jr., Belmont, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

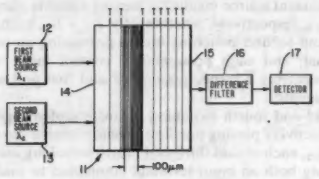
Filed Apr. 15, 1975, Ser. No. 568,533

Int. Cl.² H03F *7/04*; **G02F** *1/39*

U.S. Cl. 307—88.3 **12 Claims**

1. A method of nonlinearly processing radiant energy which method includes the steps of,

applying a beam of essentially monochromatic radiant energy to a nonlinear crystal that is transparent to said radiant energy having at least one rotational twin plane along a propagation direction having a component perpendicular to said plane,



and utilizing the nonlinearly processed radiant energy after passing through at least said one rotational twin plane.

3,988,594

ELECTRIC FENCES

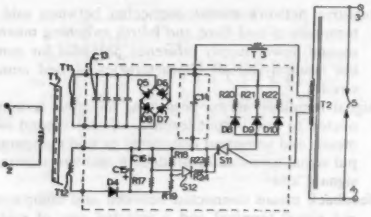
Kevin William Low, 461 Wellington Road, Marton, and Robert Browne Wilkinson, 8 Saville Row, Johnsonville, both of New Zealand

Filed Dec. 17, 1974, Ser. No. 533,623

Claims priority, application New Zealand, Dec. 20, 1973, 172966

Int. Cl.² H01H *47/00*

U.S. Cl. 307—132 R **8 Claims**



1. An electric fence controller comprising:

a charging circuit including a ferro-resonant input transformer provided with a saturable core and a primary winding and a secondary winding wound on separate legs of said saturable core;

at least one capacitor connected across said secondary winding and forming a resonant circuit therewith;

an energy storing capacitive circuit connected to said charging circuit;

a voltage multiplying output circuit; and,

a switching circuit connecting said capacitive circuit to said voltage multiplying output circuit;

said input transformer electrically isolating said output circuit from an input connected to said input transformer.

3,988,595

HIGH-GAIN DIFFERENTIAL INPUT COMPARATOR WITH EMITTER FEEDBACK INPUT HYSTERESIS

Fred L. Eatock, San Jose, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Jan. 19, 1976, Ser. No. 650,202

Int. Cl.² H03K *5/20*, *3/295*

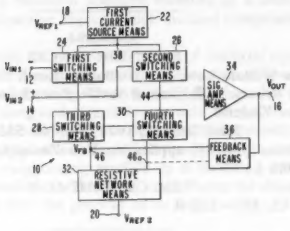
U.S. Cl. 307—235 F **14 Claims**

1. A high-gain comparator circuit structure with input hysteresis characteristics for selectively producing one od two selected outut signals on a comparator output signal terminal in response to selected differences in magnitude of first and second input signals, said structure comprising:

a first current source means connected to a first power supply reference potential for producing a first substantially constaat current 2I;

first and second switching means connected to said first current source means for passing variable currents I_{C1} and I_{C2}, respectively, wherein $2I = I_{C1} + I_{C2}$, each of said first and second switching means possessing an output terminal, and each possessing a control input terminal for receiving a respective one of said first and second input signals;

third and fourth switching means coupled together for selectively passing portions of said variable currents I_{C1} and I_{C2}, each of said third and fourth switching means possessing both an input terminal connected to said output terminal of sid first and second switching means, respectively, and at least one output terminal;



resistive network means connected between said output terminals of said third and fourth switching means and a second power supply reference potential for controlling the input hysteresis characteristics of said comparator circuit;

signal amplifier means possessing an input terminal connected to said output terminal of said second switching means and an output connected to said comparator output signal terminal for producing said two selected ouput signals; and

feedback means connected between said comparator output signal terminal and a selected one of said output terminals of said third and fourth switching means for controlling the relative current flow through said third and fourth switching means.

3,988,596

VOLTAGE MEMORY DEVICE

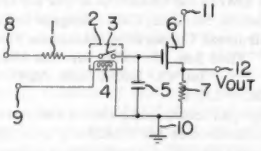
Shunji Minami, Katano, and Shunzo Oka, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 340,347, March 12, 1973, Pat. No. 3,889,133. This application Mar. 14, 1975, Ser. No. 558,557

Claims priority, application Japan, Apr. 1, 1974, 49-37138; Apr. 1, 1974, 49-37139; Apr. 1, 1974, 49-37140; Apr. 1, 1974, 49-37141; Apr. 1, 1974, 49-37675[U]

Int. Cl.[2] H03K *17/00, 17/60*

U.S. Cl. 307—246 **10 Claims**



1. A voltage memory device comprising

a. a reed relay having a contact terminal connected through an input resistor to an input voltage terminal said reed relay having a first relay coil terminal connected to a driving voltage input terminal and having a further relay coil terminal grounded;

b. a capacitor having one terminal connected to the further contact terminal of said reed relay and having a further terminal grounded;

c. a MOS field-effect transistor having a gate connected to said further contact terminal of said reed relay and to said first terminal of said capacitor, a drain being connected to a drain electric source terminal and having a source connected to an output terminal, an output resistor connecting said output terminal to ground, whereby the output voltage across said output resistor may be derived from said output terminal.

3,988,597

TIME CORRECTION CIRCUITS FOR ELECTRONIC TIMEPIECES

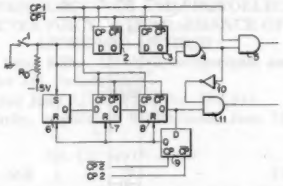
Tetsuo Yamaguchi, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Nov. 20, 1975, Ser. No. 633,688

Claims priority, application Japan, Jan. 31, 1975, 50-12373

Int. Cl.[2] H03K *17/28, 17/16, 17/02*

U.S. Cl. 307—247 A **8 Claims**



1. A time correction circuit for an electronic timepiece, comprising a switch, a first pulse generating circuit including a first shift register circuit constituted by a plurality of serially connected shift registers which are driven by a clock pulse having a first predetermined frequency for shifting an electric signal produced by the operation of said switch, said first pulse generating circuit producing a series of pulses when said switch is operated for more than a predetermined interval, and a second pulse generating circuit including a second shift register circuit composed of a plurality of serially connected shift registers which are driven by a clock pulse having a second predetermined frequency for shifting an electric signal produced by the operation of said switch, said second pulse generating circuit producing a pulse signal when said switch is operated for an interval shorter than said predetermined interval.

3,988,598

MULTIPURPOSE SEMICONDUCTOR CIRCUITS UTILIZING A NOVEL SEMICONDUCTOR DEVICE

Yoshio Ishigaki, Tokyo, and Takashi Okada, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 25, 1975, Ser. No. 561,915

Claims priority, application Japan, Apr. 10, 1974, 49-41463

Int. Cl.[2] H03K *17/68;* **H01L** *29/08*

U.S. Cl. 307—254 **7 Claims**

1. A semiconductor circuit comprising:

a. first and third transistors having first, second, and third electrodes, said first electrode of said first transistor being connected to said third electrode of said third transistor for forming a first signal transmitting path;

b. second and fourth transistors having first, second, and third electrodes, said first electrode of said second transistor being connected to said third electrode of said

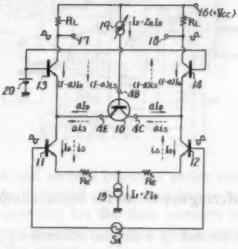
fourth transistor for forming a second signal transmitting path;

c. a current sink connecting in common to said first and second signal transmitting paths;

d. means for supplying an input signal to said second electrodes of said first and second transistors differentially;

e. an output terminal connected to at least one of said first and second signal transmitting paths;

f. a semiconductor device comprising a first semiconductor region of one type, a second semiconductor region of the other type adjacent said first region with a first semiconductor junction therebetween, a third semiconductor region of the same type as said first region adjacent said second region with a second semiconductor junction



therebetween, said first region being provided therein with a potential barrier having energy higher than that of minority carriers injected from the second region to the first region at the position facing said first junction and apart from the same by a distance smaller than a diffusion distance of the minority carriers, and first, second and third terminals led from said first, second and third regions, respectively, said first and third terminals being connected to a connection between said first and third transistors and a connection between said second and fourth transistors, respectively,

g. first means for supplying a control bias to said second terminal of said semiconductor device, and

h. second means for supplying a control bias to the second electrodes of both the third and fourth transistors.

3,988,599

SIGNAL PROCESSING CIRCUIT SUITABLE FOR WHEEL SLIP CONTROL SYSTEM FOR AUTOMOTIVE VEHICLES AND THE LIKE

Joseph E. Fleagle, Overland, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Division of Ser. No. 546,270, Feb. 3, 1975. This application Aug. 25, 1975, Ser. No. 607,701

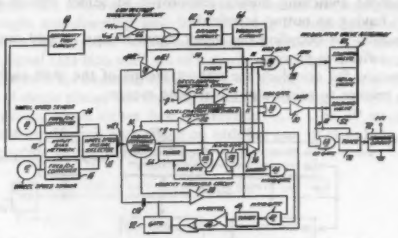
Int. Cl.² H03K *1/18*

U.S. Cl. 307—265 **16 Claims**

1. A signal processing circuit comprising:

1. first circuit means operative to receive an input signal and to generate a signal representative of the first derivative of said input signal, and further operative to generate a first variable-width pulse whenever said signal representative of the first derivative of said input signal exceeds the amplitude of a first reference signal; and

2. second circuit means operative to receive said input signal, said signal representative of the first derivative of said input signal, and said first variable-width pulse, and further operative to generate a second variable-width pulse whenever, after initiation of said first variable-width pulse, said input signal falls below the amplitude of a second reference signal which is variable in relation to both said input signal and said first derivative signal when said first derivative signal is negative, and in relation to



said first derivative signal when said first derivative signal is positive.

3,988,600

DIGITAL LOGARITHMIC FUNCTION GENERATOR

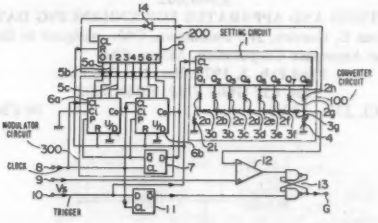
Ritsu Katsuoka, Okazaki, and Hisasi Kawai, Toyohashi, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed May 29, 1975, Ser. No. 581,886

Claims priority, application Japan, June 25, 1974, 49-72938

Int. Cl.² G06F *15/34*

U.S. Cl. 235—150.53 **3 Claims**



3. A digital logarithmic function generator comprising a first counter means for counting the number of input signals, a second counter means connected to said first counter means for incrementing said second counter means' integer content n by one each time the content of said first counter means reaches a preset count, and a third counter means connected to said second counter means for producing an output signal train, the period of which increases in proportion with 2^n each time the content of said second counter means changes from n to $(n+1)$, said third counter means producing a plurality of repetition pulses while the content of said second counter means remains constant, said first counter means receiving said output signal train of said third counter means as the input signal thereto, whereby a logarithmic function of a fragmental graph approximation with time as a variable is produced.

3,988,601

DATA PROCESSOR REORDER SHIFT REGISTER MEMORY

Richard Prather Perry, Haddon Heights, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,806

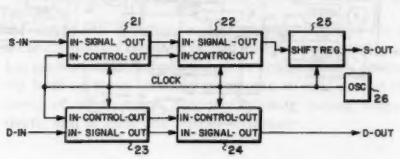
Int. Cl.² H03K *21/10*

U.S. Cl. 235—92 SH **7 Claims**

1. A reordering shift register comprising the combination of:

input signal means for receiving signals to be reordered;

clock signal input means for providing shift signals;
shift register means for storing input signals between successive shift signals, and having output means;
output switching means responsive to select signals and having an output terminal;
means for coupling the input signal means to said output switching means;
means for coupling the output means of the shift register means to said output switching means;



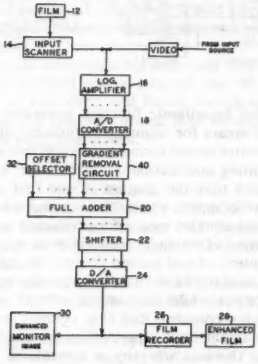
control means responsive to a control signal for producing said select signals to operate said output switching means to couple alternatively during control signal times said input signal means and said output means of the shift register means to said output terminal; and
means operated by said control means for disabling said clock signal input means during the alternate select signals which operate said output switching means to couple said input signal means to said output terminal.

3,988,602

METHOD AND APPARATUS FOR ENHANCING DATA

Thadeus E. Gorsica, Jr., Uniontown, Ohio, assignor to Goodyear Aerospace Corporation, Akron, Ohio

Filed Feb. 3, 1975, Ser. No. 546,862
Int. Cl.² G06F 7/38; H04N 7/02
U.S. Cl. 235—150.1 **10 Claims**



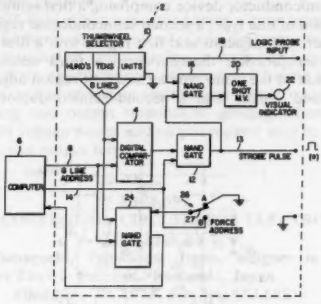
1. Apparatus for enhancing the data contained on a film transparency, comprising:
first means for scanning said film transparency in discrete elements and digitizing the data of each of said elements;
a shifting circuit connected to said first means for shifting the digitized data of each and every element a predetermined number of positions toward the most significant bit of said data;
second means connected to said shifting circuit for converting said amplified digital data into analog signals; and
third means connected to said second means for receiving said analog signals and recording the same on an output medium.

3,988,603

MICRO-PROGRAMMING FAULT ANALYZER

Edward T. Griffin, Little Ferry, N.J., assignor to The Bendix Corporation, Teterboro, N.J.

Filed Aug. 15, 1975, Ser. No. 605,128
Int. Cl.² G06F 11/00
U.S. Cl. 235—153 AC **4 Claims**



1. Fault analyzing apparatus for digital equipment, comprising:
a computer providing a diigital address signal;
operator-operative means for selecting a predetermined instruction and for providing a corresponding digital address signal;
means connected to the computer and to the instruction selecting means for comparing the digital address signals therefrom and for providing a signal when the compared address signals are coincident;
the computer providing a timing signal whenever the selected instruction is effective within the computer;
gating means connected to the comparator and to the computer and responsive to the comparison signal and to the timing signal for providing a pulse when the selected instruction is effective within the computer;
second gating means connected to the first mentioned gating means and responsive to the pulse therefrom for providing a second pulse;
means connected to the second gating means for stretching the second pulse;
indicating means connected to the pulse stretching means and responsive to the stretched pulse for indicating that the selected instruction is effective within the computer;
means connected to the operator-operative selecting means and to the computer and responsive to the digital address signals and the computer timing signal for providing a disabling signal; and
the computer connected to said last-recited means and responsive to the disabling signal therefrom for repeatedly performing the same selected instruction.

3,988,604

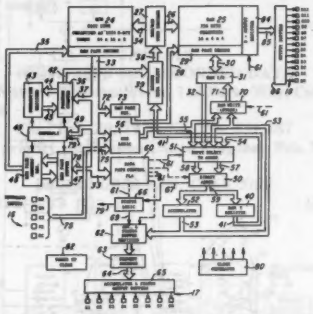
ELECTRONIC CALCULATOR OR DIGITAL PROCESSOR CHIP HAVING MULTIPLE FUNCTION ARITHMETIC UNIT OUTPUT

Joseph H. Raymond, Jr., 7618 Eichler, Houston, Tex. 77036

Filed Nov. 19, 1974, Ser. No. 525,250
Int. Cl.² G06F 7/38
U.S. Cl. 235—156 **20 Claims**

1. In an electronic digital system having data memory means with an input and an output, addressing circuitry for the data memory means, a read-only-memory for storing program instructions, control means receiving the program instructions and generating commands for defining the operation of the system, arithmetic means having an input and an output: first

and second registers each having an input to receive the output of the arithmetic means and each having an ouput; means for selectively coupling the input of the arithmetic means under commands from the control means to the outputs of either of the first and second registers and to the output of the data memory means; means for selectively coupling the outputs of the first and second registers under command of the control means to the input of the data memory means and to the addressing circuitry for the data memory means, respectively; and means for coupling a part of a program instruction to the input of the arithmetic means under command of the control means.



3,988,605

PROCESSORS FOR THE FAST TRANSFORMATION OF DATA

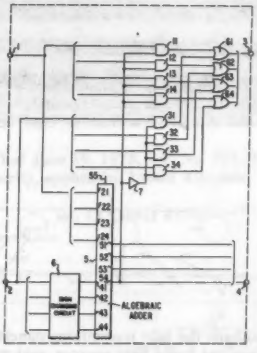
Rene F. Guillou, Rennes, and Yves F. Fouche, Saint-Jacques-de-la Lande, both of France, assignors to Etat Francais, France

Filed Feb. 12, 1975, Ser. No. 549,309

Claims priority, application France, Feb. 25, 1974, 74.06264

Int. Cl.² G06F *15/34*

U.S. Cl. 235—156 **6 Claims**



1. A straight transforming processor for transforming N signals a_i, wherein $i = 1$, N and $N = 2^n$, comprising first pairing means for arranging said N signals into N/2 first pairs of ordered signals, N/2 first straight transforming units for transforming said N/2 first pairs into N/2 pairs of first signals (m, D), second pairing means for arranging N/2 first signals (m) into N/4 second pairs of first signals (m), first ordering means for ordering and storing N/2 first signals (D) into a first set of places, N/4 second straight transforming units for transforming said N/4 second pairs of first signals (m) into N/4 pairs of second signals (m,D), third pairing means for arranging N/4 second signals (m) into N/8 third pairs of second signals (m), second ordering means for ordering and storing N/4 second signals (D) into a second set of places, and so on, until the n^{th} straight transforming unit for delivering a single pair of n^{th} signals (m,D) an n^{th} ordering means for ordering and storing n^{th} signal (D) into a n^{th} set of a single place, and $n+1^{th}$ ordering means for ordering and storing n^{th} signal (m) into a $n+1^{th}$ set of single place, and reading means for reading said $n+1$ sets of places, each either first, or second, . . . , or n^{th} straight transforming unit processing an ordered pair of signals (a_i,a_j) according to the following logic relations:

$$m = a_i \text{ and sign of } (a_i = a_j) \text{ or } a_j \text{ and } \overline{\text{sign of } (a_i - a_j)} \quad (1)$$

$$D = a_i - a_j \quad (2)$$

and delivering signals (m,D).

3,988,606

DIGITAL FILTER DEVICE FOR PROCESSING BINARY-CODED SIGNAL SAMPLES

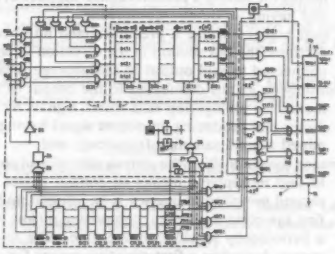
Ludwig Désiré Johan Eggermont, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 30, 1975, Ser. No. 582,309

Claims priority, application Netherlands, June 17, 1974, 7408032

Int. Cl.² G06F *15/34*

U.S. Cl. 235—156 **10 Claims**



1. A digital filter comprising

input means for supplying a sequence of input signals with a predetermined input sampling frequency;

storage means, connected to said input means for storing a pedetermined number of successive input signals, and having an output;

multiplying means for multiplying the signals stored in said storage means by weighting factors to produce a product signal; and

control means, connected to said storage means and said multiplying means, for supplying one of said input signals stored in said storage means a predetermined number of times to said multiplying means for multiplication with corresponding multipliers associated with one of said weighting factors.

3,988,607
INTERPOLATING DIGITAL FILTER

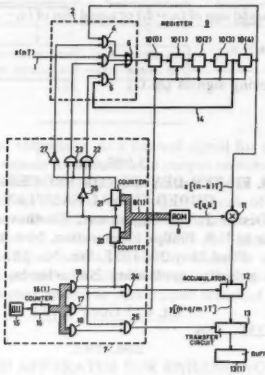
Ludwig Désiré Johan Eggermont; Hendrik Arie Van Essen; Petrus Josephus Van Gerwen, and Wilfred André Maria Snijders, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,630

Claims priority, application Netherlands, Sept. 16, 1974, 12224

Int. Cl.² G06F *7/38, 15/34*

U.S. Cl. 235—156 **7 Claims**



1. A digital filter comprising

input means for supplying a sequence of signals with a predetermined first sampling frequency;

storage means having an input connected to said input means for storing a predetermined number of said signals, and having an output; comprising

a shift register having a predetermined number of register sections, the last section in the direction of shifting being connected to said output of said storage means;

multiplying means connected to the output of said storage means for multiplying said stored signals by a weighting factor and producing an output signal having a predetermined second sampling frequency; and

means for controlling the output rate of said storage means to said multiplying means by control pulses so that said second sampling frequency is an integral multiple of said first sampling frequency, comprising means for providing a periodically varying storage time pulse to said storage means, including a first counting means for counting the number of shift pulses applied by said clock pulse generator, and second counting means connected to said first counting means for registering a predetermined count in said first counting means.

3,988,608
ADAPTIVE IMAGING TELESCOPE WITH NONLINEAR SENSING AND ELECTRO-OPTICAL PHASE SHIFTING

Thomas R. O'Meara, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed June 24, 1974, Ser. No. 482,186

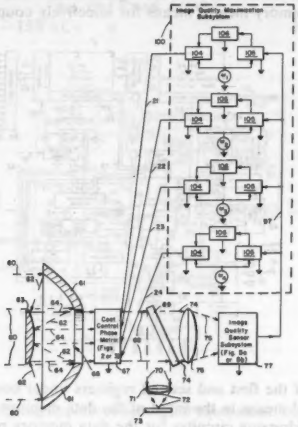
Int. Cl.² G01J *1/20*

U.S. Cl. 250—201 **21 Claims**

1. In an adaptive imaging telescope for detecting an optical beam received thereby, comprising in combination:

a phase shifter, including a planar crystal having two major surfaces and a plurality of electrodes attached to the major surfaces, which phase shifter is positioned in a plane parallel to the plane of the aperture of the telescope, responsive to an optical image, communicated by said beam;

first means, optically coupled to the phase shifter, comprising a photodetector, positioned substantially orthogonally to said optical beam, responsive to the optical image for converting said image into an electrical signal, which is



non-linear in magnitude with respect to the signal of said optical beam; and

second means, electrically coupling the first means and the phase shifter, for providing phase modulation of the optical beam.

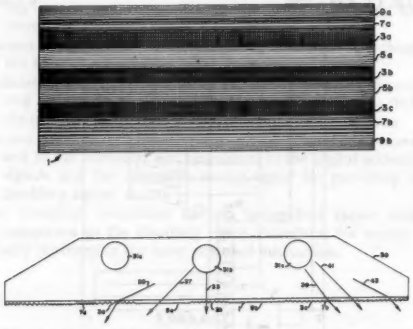
3,988,609
LIGHTING PANEL AND LUMINAIRE USING IT

Ian Lewin, Scottsdale, Ariz., assignor to K-S-H, Inc., St. Louis, Mo.

Filed Mar. 14, 1975, Ser. No. 558,436

Int. Cl.² F21C *5/02*

U.S. Cl. 240—106 R **22 Claims**



1. A substantially flat light transmitting panel for use below at least two parallel linear light sources, said panel having a generally smooth upper surface and a lower surface having a plurality of parallel light controlling bands, said bands comprising:

a. a first set of bands, at least two of said first set of bands being adapted to lie substantially below said linear light sources, each of said first set of bands comprising means for reducing high angle glare both along and across said light sources;

b. a second set of bands, each band of said second set of bands separating one band of said first set of bands from

another band of said first set of bands, each of said second set of bands permitting most light to pass through without substantial alteration in direction; and

c. a third set of bands comprising first and second bands outboard of said first set of bands, each band of said third set of bands comprising means for reducing the angle at which light is emitted below said panel across the linear light sources.

3,988,610

DIGITIZING OF RECORDED DATA

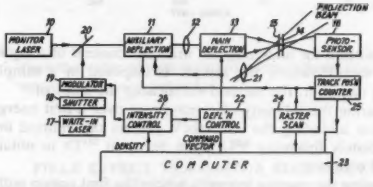
Graham Stewart Brandon Street, 115 Perse Way, Cambridge, England

Filed Feb. 20, 1975, Ser. No. 551,567

Claims priority, application United Kingdom, Feb. 21, 1974, 7836/74

Int. Cl.² G05B 1/00; G06K 5/00

U.S. Cl. 250—202 **15 Claims**



8. In apparatus for reading a record by means of a steered monitoring beam which is transmitted or reflected by the lines of the record more than by the background, the improvement comprising, means for supporting a sheet of photo-sensitive material adjacent the record, means for generating an activating beam capable of activating said photo-sensitive material means for storing line position information obtained by the reading operation, and means for steering said activating beam under the control of said stored position information to trace a line or part line of the record which has been read and thereby activate that part of the photosensitive material adjacent the read line or part line of the record, whereby the said line or part line which has been read can be distinguished from the lines which have not.

3,988,611

DIRECT VOLTAGE POWER SUPPLY APPARATUS

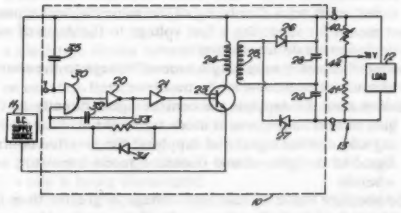
Arthur Gordon Davies, London, England, assignor to Medical & Electrical Instrumentation Company Limited, London, England

Filed June 19, 1975, Ser. No. 588,392

Claims priority, application United Kingdom, July 6, 1974, 30076/74

Int. Cl.² H01J 43/30

U.S. Cl. 250—207 **15 Claims**



1. A photomultiplier tube direct current power supply circuit comprising a d.c. source, an inverter energized from said d.c. source, a pair of output terminals, rectifier means coupled to the inverter to provide a direct voltage across said pair of output terminals, a photomultiplier tube, circuit means connecting said output terminals to said photomultiplier tube and a potential divider circuit across said output terminals having a tap at which a voltage is produced, and wherein said inverter comprises a pulse generator having a chain of inverters with a feedback circuit and voltage-controlled switch means operative to inhibit pulse recurrence when a control voltage applied to said switch means exceeds a predetermined value and means applying said voltage from the potential divider circuit to said switch means as said control voltage whereby pulse generation is inhibited when the voltage across said output terminals exceeds a predetermined level.

3,988,612

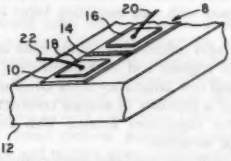
PHOTODETECTOR ARRAY AND METHOD OF MANUFACTURING SAME

John P. Palmer, Pomona, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Filed Apr. 19, 1973, Ser. No. 352,777

Int. Cl.² G02B 5/14; H01J 5/16, 39/12; H01L 31/08

U.S. Cl. 250—211 R **9 Claims**



1. A photoconductive array cell comprising:

an insulative material substrate;

a photosensitizable thin film disposed on said substrate and having a portion thereof made photosensitive and determining substantially the electrical resistance of the thin film; and

a pair of spaced apart electrodes disposed on said thin film on opposite sides of the photosensitized portion.

3,988,613

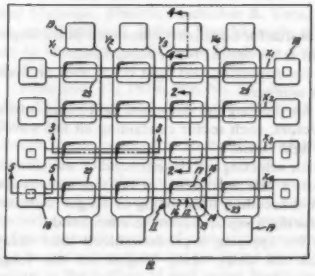
RADIATION SENSING AND CHARGE STORAGE DEVICES

Dale M. Brown, Schenectady; Mario Ghezzo, Ballston Lake, and Marvin Garfinkel, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 2, 1975, Ser. No. 573,842

Int. Cl.² H01L 27/14

U.S. Cl. 250—211 J **11 Claims**



1. A radiation sensing array comprising

a substrate of semiconductor material having a major surface, said substrate having a plurality of active surface regions lying in said major surface and arranged into a plurality of rows and columns, said active surface regions being of substantially identical area and outline, the outlines of said active surface regions being identically oriented with respect to the directions of said rows and columns, a thick layer of insulating material overlying said major surface having a plurality of thin portions, each in registry with a respective one of said active surface regions,

a plurality of parallel row conductor lines, each of the same and uniform width overlying said layer of insulating material, each row conductor line being in traversing relationship to the active surface regions of a respective row of active surface regions and overlying identical first portions of the active surface regions of a respective row,

a plurality of parallel column conductor lines of the same and uniform width insulatingly overlying said row conductor lines, each column conductor line being in traversing relationship to the active surface regions of a respective column of active surface regions and overlying entirely the active surface regions of the respective column, said column lines being orthogonal to said row lines,

the portions of said row conductor lines overlying said active surface regions consituting the conductors of a plurality of first conductor-insulator-semiconductor capacitors formed with said insulating layer and said substrate,

the portions of said column conductor lines overlying said active surface regions and unshielded from said surface regions by said row conductor lines consituting the split conductors of a plurality of second conductor-insulator-semiconductor capacitors formed with said insulating layer and said substrate,

each second conductor-insulator-semiconductor capacitor including a pair of capacitors each coupled to a respective first conductor-insulator-semiconductor capacitor.

3,988,614

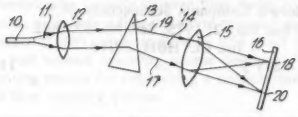
EQUALIZATION OF CHROMATIC PULSE DISPERSION IN OPTICAL FIBRES

Felix Paul Kapron, Richmond, and John Charles Wood Taylor, Aylmer, both of Canada, assignors to Northern Electric Company Limited, Montreal, Canada

Filed June 30, 1975, Ser. No. 591,498

Int. Cl.² G02B *5/14*; H01J *5/16*

U.S. Cl. 250—227 **12 Claims**



7. Apparatus for equalizing chromatic pulse dispersion of a light beam in an optical fibre, comprising:

means for dispersing said light beam over an area in a uniform manner;

means for dividing the dispersed light beam into a plurality of sectors, each sector containing all the wavelengths of said light beam;

means for selecting a different band of wavelengths in each sector, a first band being of the shorter wavelengths and each succeeding band being of longer wavelengths, and producing a signal related to each band;

means for applying a predetermined time delay to each signal, the delay being longest for the longest wavelengths; and

means for combining the delayed signals into a single output.

3,988,615

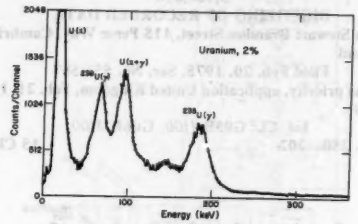
METHOD FOR RADIOACTIVITY MONITORING

C. John Umbarger, Los Alamos, and Leo R. Cowder, Santa Fe, both of N. Mex., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 28, 1975, Ser. No. 572,042

Int. Cl.² G01T *1/20*; G01V *5/00*

U.S. Cl. 250—253 **3 Claims**



1. A method for analyzing the uranium content of a liquid effluent sample where the sample is disposed in a sample counting chamber, the method comprising the steps of:

monitoring the intensity of gamma rays over a first energy region including the 185.7-keV gamma ray emitted immediately following ^{235}U alpha decay to ^{231}Th to obtain ^{235}U content;

measuring the gamma intensity within the first region without samples to obtain background count;

subtracting any room background 185.7-keV gamma ray;

producing a first signal representative thereof;

monitoring the intensity of gamma rays over a second energy region including the ≈ 63-keV gamma ray doublet found in the nucleus of ^{234}Pa a granddaughter of ^{238}U;

measuring the gamma intensity within the second region without samples to obtain background count;

subtracting any room background 63-keV gamma ray and producing a second signal representative thereof; and

determining the ratio of the 63-keV and 185.7-keV gamma ray emission by comparing the first and second signals to provide a signal representative of the uranium enrichment of said sample.

3,988,616

DRIVER CIRCUIT FOR LIQUID CRYSTAL DISPLAY USING INSULATED GATE FETS

Shunji Shimada, Kodaira, Japan, assignor to Hitachi, Ltd., Japan

Filed July 9, 1975, Ser. No. 594,439

Claims priority, application United Kingdom, July 15, 1974, 31283/74

Int. Cl.² H03K *3/353*; G08B *5/36*; G02F *1/13*; H03K *19/08*

U.S. Cl. 307—270 **11 Claims**

1. A driver circuit comprising:

a first depletion mode field effect transistor and a first enhancement mode field effect transistor connected in series, each transistor being of the same channel types

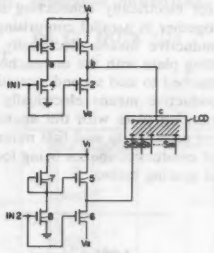
first means for supplying a first voltage to the drain of said depletion mode transistors;

second means for supplying a second voltage to the source of said enhancement mode transistor; and

third means for supplying a control signal directly to the gate of said enhancement mode transistor, and for inverting said control signal and supplying the inverted control signal to the gate of said depletion mode transistor; and wherein

the absolute value of said first voltage is greater than the absolute value of said second voltage and said second voltage is of sufficient magnitude to turn said depletion mode transistor off when the gate of said depletion mode

transistor is at a reference potential, the absolute value of which is smaller than that of said second voltage, at which



time the value of said inverted control signal corresponds to said reference potential.

3,988,617

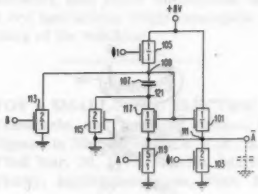
FIELD EFFECT TRANSISTOR BIAS CIRCUIT

Cyrul Arthur Price, Kingston, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,394

Int. Cl.² H03K *17/60, 19/08, 19/40, 3/353*

U.S. Cl. 307—270 **8 Claims**



1. An improved bootstrap bias circuit comprising:

a device connected between a voltage source and a first circuit node for charging a capacitor;

said capacitor having a first conducting surface connected to said first circuit node;

a load device connected between said voltage source and a second circuit node for charging the capacitance of said second node;

a control gate of said load device being connected to said first node;

a discharge device connected between a reference voltage source and said first node for discharging said first node;

an isolation device connected between a second conductive surface of said capacitor and said second node, said isolation device having a control gate connected to said first node for controlling said isolation device to prevent substantial discharge of said second node while said first node is being discharged;

a switching device connected between said reference voltage source and said second node for discharging said capacitance of said second node to complete a current path for charging said capacitor.

3,988,618

ELECTRICAL ANGLE DELAY CIRCUIT

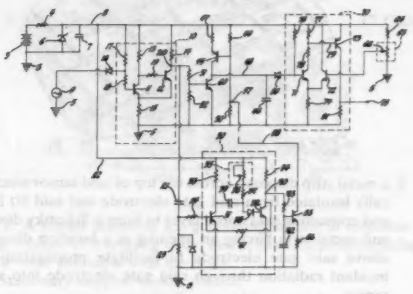
Curtis D. Munden, and Robert E. Campbell, both of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 1, 1974, Ser. No. 519,932

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H03K *5/13, 5/159*

U.S. Cl. 307—293 **5 Claims**



1. An electrical angle delay circuit for producing an output signal which is delayed the same selectable number of electrical degrees from the positive to negative polarity zero crossover point of each cycle of all frequencies of a variable frequency alternating current input signal comprising: circuit means responsive to said alternating current input signal for producing a direct current potential synchronizing signal having leading and trailing edges corresponding to the negative to positive polarity zero crossover point and to the positive to negative polarity zero crossover point, respectively, of each cycle of said alternating current input signal; circuit means responsive to said leading edge of said synchronizing signals for producing a range signal of a direct potential level directly proportional to the frequency of said alternating current input signal; timing circuit means arranged to be electrically influenced by said range signal for producing a direct current potential ramp timing signal which is initiated at the positive to negative polarity zero crossover point of each cycle of said alternating current input signal and increases linearly in potential level at a rate determined by the potential level of said range signal; means for producing a delay signal of a selectable direct current potential level; and circuit means responsive to said timing signal and said delay signal for producing an output signal when the potential level of said timing signal increases to that of said delay signal.

3,988,619

RANDOM ACCESS SOLID-STATE IMAGE SENSOR WITH NON-DESTRUCTIVE READ-OUT

Shashi Dhar Malaviya, Fishkill; Madhukar B. Vora, Hopewell Junction, and William T. Wilson, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 27, 1974, Ser. No. 537,007

Int. Cl.² H01L *31/10, 27/14, 29/80, 29/48*

U.S. Cl. 307—311 **12 Claims**

6. An image sensor responsive to incident radiation comprising:

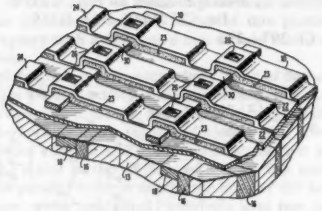
a. a semiconductor wafer comprising a substrate of a first type conductivity having an upper layer of a second type conductivity deposited on one surface thereof;

b. an isolated impurity region of said first type conductivity formed in said upper layer, said isolated impurity region extending to the surface of said upper layer;

c. a bit line comprising an impurity region of said second type conductivity in said upper layer, said latter impurity

region having a higher conductivity than the remaining portion of said upper layer;

d. a gate electrode transparent to said incident radiation positioned directly above and electrically insulated from said isolated region; and



e. a metal strip disposed across the top of said sensor electrically insulated from said gate electrode and said bit line and contacting said upper layer to form a Schottky diode, and metal strip having an opening at a location directly above said gate electrode to facilitate propagation of incident radiation through said gate electrode into said sensor.

3,988,620

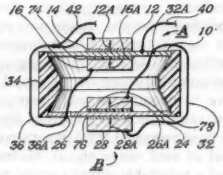
TRANSDUCER HAVING ENHANCED ACCELERATION CANCELLATION CHARACTERISTICS

William T. McDavid, Richardson, Tex., assignor to Aquatronics, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 202,316, Nov. 26, 1971, abandoned. This application May 24, 1972, Ser. No. 256,358

Int. Cl.[2] H01L *41/08*

U.S. Cl. 310—8.6 **4 Claims**



1. A transducer assembly for sensing pressure variations in a fluid medium, comprising:

a piezoelectric element conductively attached to one side of a first conductive mounting plate to form a first subassembly,

a piezoelectric element conductively attached to one side of a second conductive mounting plate to form a second subassembly,

each element having opposite facing surfaces,

each element being polarized such that its opposite facing surfaces have opposite polarities,

the element attached to said first conductive mounting plate having a surface of one polarity attached to said one side of said first conductive mounting plate,

the element attached to said secnd mounting plate having a surface of a polarity opposite said one polarity, attached to said one side of said second conductive mounting plate,

an electrical insulating spacng means having an aperture extending therethrough between opposite supporting ends,

said first and second mounting plates being supported at said opposite ends respectively of said spacing means in a manner to face the unattached surfaces of said elements in opposite directions and to face surfaces of like polarity of said elements in the same direction, and

means for electrically connecting said piezoelectric elements together in parallel,

said two mounting plates are supported at the opposite ends of said spacing means in a manner to face the unattached surfaces of said elements outward in opposite directions,

said means for electrically connecting said piezoelectric elements together in parallel comprising:

electrical conductive means electrically connecting said first mounting plate with the unattached surface of said element attached to said second mounting plate,

electrical conductive means electrically connecting said second mounting plate with the unattached surface of said element attached to said first mounting plate,

said electrical conductive means being located on the outside of said spacing means.

3,988,621

SUPPORTING STRUCTURE FOR A THICKNESS-SHEAR TYPE QUARTZ OSCILLATOR

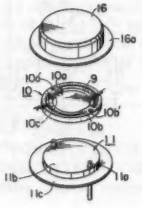
Toshihiko Nakayama, Tokorozawa; Hiroshi Hishida, Sayama; Hisao Wakabayashi, Higashikurume; Hisao Yoshikawa, Tokorozawa, and Isao Koyama, Kodaira, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Dec. 4, 1974, Ser. No. 529,473

Claims priority, application Japan, Dec. 10, 1973, 48-141162; Sept. 16, 1971, 46-72019

Int. Cl.[2] H01L *41/04*

U.S. Cl. 310—9.4 **3 Claims**



1. A thickness-shear type quartz crystal oscillator-supporting structure comprising an elastic ring, said ring being formed with a plurality of spaced, radially inwardly and integrally extending projections from said ring, said projections representing concentric recesses of opposite configurations one after another adapted for establishing pressure contact with said quartz crystal at their opposite surfaces and at different peripheral areas thereof, said projections include at least one pair of diametrically arranged projections, each of which is formed with a downwardly and radially inwardly opening angular circumferential groove, for establishing contact with the upper circumferential surface of said quartz crystal, and wherein said projections further include at least one pair of diametrically arranged projections, each of which is formed with an upwardly and radially inwardly opening angular circumferential groove, for establishing contact with the lower circumferential surface of said quartz crystal.

3,988,622

DYNAMO-ELECTRIC MACHINE WITH PRESTRESSED LAMINATED STATOR COMPONENT

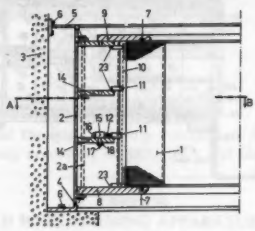
Mihailo Starcevic, Mellingen, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Continuation of Ser. No. 422,099, Dec. 5, 1973, abandoned. This application Aug. 6, 1975, Ser. No. 602,187

Claims priority, application Switzerland, Dec. 11, 1972, 17891/72

Int. Cl.² H02K 5/24

U.S. Cl. 310—91 9 Claims



1. In a dynamo-electric machine of the type including a stator structure comprising a vertically disposed axially compressed assembly of annular laminations extending in radial planes relative to the vertical axis of the machine and a stator frame surrounding said annular lamination assembly, the improvement which resides in means interconnecting said stator frame with said annular lamination assembly such that said annular lamination assembly is pre-stressed in tension by said stator frame in a radially outward direction with respect to a cold condition of the machine, the magnitude of said pre-stress corresponding substantially to the difference in expansion between said stator laminations secured to the stator frame and laminations freely expandable at the operating temperature of the machine.

3,988,623

CASE FOR A SMALL-SIZED ELECTRIC MOTOR

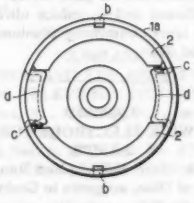
Terumoto Yamaguchi, and Yoshinao Amano, both of Anjo, Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Mar. 20, 1973, Ser. No. 342,984

Claims priority, application Japan, Mar. 30, 1972, 47-37761

Int. Cl.² H02K 1/18

U.S. Cl. 310—154 2 Claims



1. A metallic case for a small-sized electric motor in which arched magnets are disposed on an inner periphery of a cylindrical portion of the case comprising,

a shoulder extending inwardly from said inner periphery in a radial direction for abutting an end face of said magnet in the axial direction thereof, a convex portion protruding inwardly from said cylindrical portion in the radial direction, and

a first projection having a spring action integrally provided on one side of said convex portion for urging said magnet in a circular direction, whereby said magnet is secured to the inner periphery of said cylindrical portion.

3,988,624

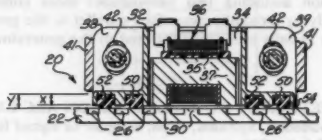
SELF-GAUGING SENSOR ASSEMBLY

John A. Urban, Livonia, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 15, 1971, Ser. No. 124,301

Int. Cl.² H02K 19/20

U.S. Cl. 310—168 17 Claims



1. A sensor assembly for generating signals in response to the rotation of a rotating body, said sensor assembly including

a rotor rotatable with the body,

stationary support braket means,

sensor means supported on said support bracket means adjacent said rotor and cooperating with said rotor to define a gap therebetween,

adjustable securing means for securing said sensor means on said bracket means;

said adjustable securing means permitting movement of said sensor means on said bracket means toward and away from said rotor, and

gauging means on one of said sensor means and rotor and projecting toward and engagable with the other of said sensor means and rotor for limiting movement of said sensor means toward said rotor.

3,988,625

COIL OVERHANG SUPPORT FOR STATOR OF HIGH OUTPUT TURBO-GENERATOR

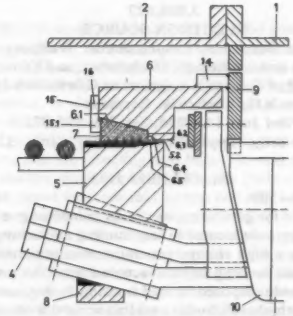
Kurt Jáger; Eúgen Kúnz, and Jósko Vlah, all of Mannheim, Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Dec. 5, 1974, Ser. No. 529,894

Claims priority, application Germany, Dec. 15, 1973, 2362406

Int. Cl.² H02K 3/46

U.S. Cl. 310—260 6 Claims



1. An arragement for supporting the head portions of the coils which project beyond the ends of the slots provided in the laminated stator component of a high-output turbogenera-

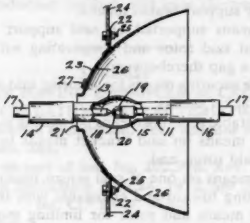
tor in which the coils are placed, comprising inner and outer radially spaced rings made from an electrically insulating material and between which a cylindric array of coil heads is secured, a continuous supporting ring secured to the general housing structure of the generator and which surrounds and is spaced radially outward from said outer ring, and a continuous ring structure made from a rubber-like resilient material interposed between and in engagement with the corresponding faces of said continuous supporting ring and said outer ring for the purpose of compensating for unequal expansion coefficients of the copper conductors of the stator coils and the iron of the laminated stator component, said continuous rubber-like resilient ring structure having a trapezoidal profile in cross-section including two non-parallel faces constituted respectively by a radially inner face parallel to the generator axis and a radially outer face inclined to the generator axis.

3,988,626

MAGNETICALLY STABILIZED XENON ARC LAMP

Angelo Boudouris, Sylvania, Ohio, assignor to Eprad Incorporated, Toledo, Ohio

Filed May 12, 1975, Ser. No. 576,378
Int. Cl.² H01J *1/50, 61/16*
U.S. Cl. 313—113 **5 Claims**



1. In a lamphousing, an improved light source comprising an arc lamp having horizontally oriented electrodes, a thin-walled light reflector formed from a paramagnetic material, said reflector having an exterior surface and an interior light reflecting surface for reflecting light emitted from said arc lamp, at least one permanent magnet, and means attaching said magnet at a predetermined point and with a predetermined pole orientation to said exterior reflector surface as to magnetize a portion of said reflector to establish a magnetic field within said reflector which stabilizes the arc in said arc lamp.

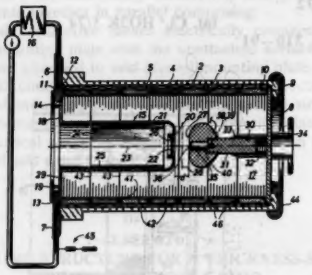
3,988,627

ELECTRON SOURCE

Cord-Henrich Dustmann, Leopoldshafen; Wolfgang Zernial, Karlsruhe; Helmut Krauth, Hochstetten, and Edmund Süss, Staffort, all of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed July 14, 1975, Ser. No. 595,875
Claims priority, application Germany, July 13, 1974, 2433781
Int. Cl.² H01J *1/02*
U.S. Cl. 313—309 **14 Claims**

1. A source for generating electrons comprising: a housing; a cathode electrode located in said housing and arranged to be connected to a high voltage generator; means permitting the interior of said housing to be evacuated from the outside; an anode electrode disposed in said housing facing, and spaced from, said cathode electrode; a grid associated with said anode electrode and arranged to permit electrons emanating from said cathode electrode to pass therethrough, said grid defining a plane with one face of said anode electrode; means constituting part of the walls of said housing to give such walls a variable electrical resistance which is adjustable to match the impedance of the cathode electrode-anode electrode system to that of the high voltage generator; a cylinder extending into said housing, said anode electrode forming one end face of said cylinder, and a flange located at one end of said housing



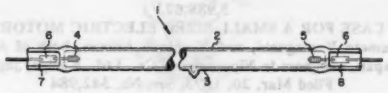
and supporting said cylinder, said one end face of said cylinder being provided with an opening closed by said anode grid, said grid being disposed opposite the frontal face of said cathode electrode.

3,988,628

METAL HALIDE LAMP WITH TITANIA-SILICATE BARRIER ZONE IN FUSED SILICA ENVELOPE

Edward M. Clausen, Eastlake, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed June 13, 1974, Ser. No. 478,926
Int. Cl.² H01J *61/22, 61/35*
U.S. Cl. 313—112 **3 Claims**



1. A metal halide lamp comprising a fused silica envelope containing a fill including sodium halide, said envelope having on the outside a titania silicate glass surface layer serving to inhibit sodium diffusion and to reduce ultraviolet transmission, said surface layer comprising titanium oxide heat-diffused into the fused silica.

3,988,629

THERMIONIC WICK ELECTRODE FOR DISCHARGE LAMPS

John E. White, Cleveland Heights, and Ranajit K. Datta, E. Cleveland, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 7, 1974, Ser. No. 512,680
Int. Cl.² H01J *1/14, 61/073, 61/20*
U.S. Cl. 313—184 **6 Claims**

4. An electrode for an arc discharge lamp comprising a porous refractory metal substrate and a glassy emission material impregnating the pores thereof, said emission material comprising a low work function metal oxide and a glass forming component which together have the property of producing a fluid at high temperature which migrates to the surface of

the matrix and provides activation, said low work function oxide being selected from the group consisting of BaO, SrO,

and CaO and the glass forming component being selected from the group consisting of SiO_2, B_2O_3 and GeO_2.

3,988,630

LEAD WIRE FORMING APPARATUS FOR INCANDESCENT FILAMENTS

Harold G. Anderson, Kirtland, and Robert E. Louden, Youngstown, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed July 11, 1975, Ser. No. 595,271
Int. Cl.² H01G 5/50
U.S. Cl. 313—331 **12 Claims**

12. An improved electric lamp having a light-transmitting envelope, a base, a filament, and conductive leads connecting said base to said filament, wherein the improvement comprises:

said conductive leads having flattened and uniformly curved end portions wrapped around the ends of said filament contacting said filament substantially about a single circumference thereof, and extending orthogonally from said filament.

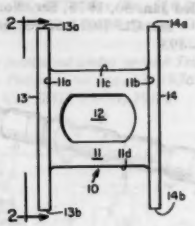
3,988,631

PIN FOR SUPPORTING THE APERTURE MASK IN A COLOR TELEVISION PICTURE TUBE

Harris G. Rodgers, Sr., Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,646
Int. Cl.² H01J 29/02
U.S. Cl. 313—402 **8 Claims**

1. For use in a color cathode ray tube envelope for supporting an aperture mask on such envelope, a channel-shaped pin having a central portion for making retentive coupling engagement with said mask and a pair of similar side portions extending at similar angles from a first pair of opposite edges of said central portion, such side portions having a length greater than the length of said central portion, such pin having geometric symmetry both on opposite sides of a first plane extending through the center of said central portion of the pin parallel with said first pair of edges, and also on opposite sides of a second plane extending through said center of such central portion normal to said first plane and parallel with a



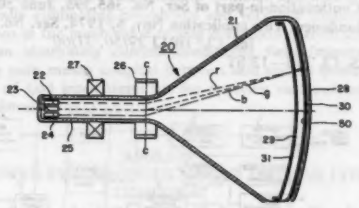
second pair of opposite edges of the central portion, and a pair of corresponding ends of said side portions being adapted for embedment in said envelope.

3,988,632

BLACK-SURROUND COLOR PICTURE TUBE

Leonard Dietch, Skokie, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Continuation of Ser. No. 186,885, Oct. 6, 1971, abandoned. This application May 24, 1973, Ser. No. 363,787
Int. Cl.² H01J 29/07, 31/20
U.S. Cl. 313—408 **7 Claims**



1. A shadow mask color cathode-ray tube comprising:

a mosaic screen of phosphor triads distributed in accordance with a predetermined pattern over an image area and individually including a deposit of green-emitting phosphor, a deposit of blue-emitting phosphor and a deposit of red-emitting phosphor;

beam generating means for developing three electron beams and for directing said beams to said screen;

and a shadow mask disposed across the paths of said beams in the space between said screen and said beam generating means having spot-forming apertures corresponding in number to, and arrayed in accordance with the same distribution pattern as, said triads with each aperture aligned with respect to an assigned one of said triads, the beam spots and the respectively associated phosphor deposits having a relative size difference which varies between the central portion and the peripheral portions of the screen from a condition in which the beam spots are larger than the associated phosphor deposits to a condition in which the beam spots are smaller than the phosphor deposits.

3,988,633

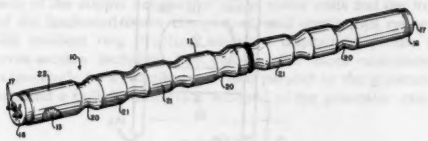
FLUORESCENT LAMP WITH ENVELOPE GROOVES

Joel Shurgan, Washington Township, Bergen County; Donald P. Northrop, Glen Rock, both of N.J., and Gordon D. Coplein, Merrick, L.I., N.Y., assignors to Duro-Test Corporation, North Bergen, N.J.

Filed Jan. 30, 1975, Ser. No. 545,485

Int. Cl.² H01J *61/33, 61/42*

U.S. Cl. 313—493 **10 Claims**



1. A fluorescent lamp comprising an elongated cylindrical envelope of vitreous material, cathode means at each end of the envelope, a phosphor on the inner wall of said envelope and means within said envelope for producing an arc stream discharge when a voltage is applied across said cathodes, said cylindrical envelope being formed with a plurality of depressed grooves to interact with the arc stream discharge, each of said grooves extending around a major portion of the cylindrical envelope surface and being separate and independent of each other, the areas of the envelope without the grooves defining an overall cylindrical shape for the envelope.

3,988,634

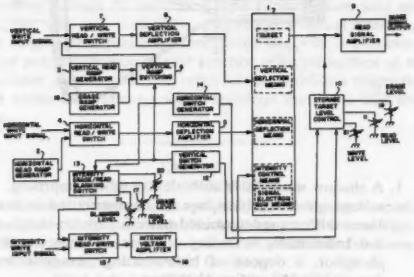
CONTROLLED STORAGE LEVEL FOR A STORAGE CATHODE-RAY TUBE

Dan Franklin Denham, Portland, and Lawrence Gerald Biggs, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Continuation-in-part of Ser. No. 365,395, June 30, 1973, abandoned. This application Nov. 6, 1974, Ser. No. 521,321

Int. Cl.² H01J *29/50, 31/00*

U.S. Cl. 315—13 ST **5 Claims**



1. A storage tube scan conversion system apparatus, comprising:

a cathode-ray tube having a single electron gun and a storage target position to receive beam electrons admitted from such gun;

means including a deflection system for causing said gun to write an electrical image on said storage target;

means including a deflection system for causing said gun to produce successive readout patterns of said electrical image on said storage target;

means including a deflection system for causing said gun to erase such electrical image on said storage target;

means for selectively preparing said storage target for writing, reading, and erasing;

switch means for switching between said means for causing write, readout, and erase to provide variable persistence; and

means responsive to variations of said readout pattern to provide an electric signal for use to visually produce such pattern.

3,988,635

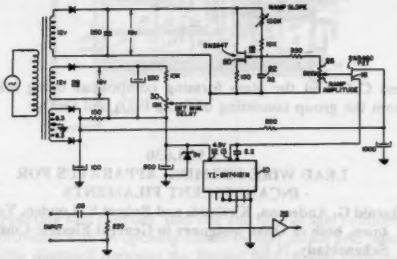
SLOW MOTION TIMING CIRCUIT FOR A STROBOSCOPE

Andrew W. Vincent, 65 Aberdeen St., Rochester, N.Y. 14619

Filed Apr. 5, 1974, Ser. No. 458,282

Int. Cl.² H05B *37/00;* **H03K** *3/284*

U.S. Cl. 315—200 A **3 Claims**



1. A control circuit for triggering a stroboscope or similar device responsively to electrical input signals that occur at times when a repetitively moving object to be observed is at a preselected point in its travel, said circuit comprising a controllable interval timer, means for starting said timer in response to applied input signals, a ramp voltage generator, and means for controlling said interval timer responsively to the ramp voltage produced by said generator to cause the intervals timed by said timer to become successively longer as the ramp progresses, said interval timer including means for producing an output signal at the end of each interval timed by it for triggering the device to be triggered, the ramp voltage having a period several times the duration of the longest interval timable by said timer.

3,988,636

MAGNETRON WITH CATHODE END SHIELDS COATED WITH SECONDARY ELECTRON EMISSION INHIBITING MATERIAL

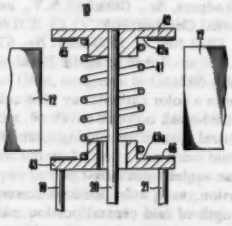
Masami Sato, Mobara; Hiroshi Hisada, Ichihara, and Tomokatsu Oguro, Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 26, 1975, Ser. No. 562,353

Claims priority, application Japan, Apr. 2, 1974, 49-37661[U]

Int. Cl.² H01J *25/50*

U.S. Cl. 315—39.51 **12 Claims**



1. In a magnetron of the type including a cathode electrode, an anode electrode surrounding the cathode electrode, and

end shields mounted on the opposite ends of the cathode electrode, the improvement which comprises a layer of a metal powder selected from the group molybdenum, tungsten and alloys thereof to suppress secondary electron emission applied onto a portion of the opposing surfaces of said end shields.

3,988,637

CIRCUIT ARRANGEMENT FOR GENERATING IN A PICTURE DISPLAY DEVICE A SAWTOOTH CURRENT OF LINE FREQUENCY HAVING AN AMPLITUDE VARYING AT FIELD FREQUENCY

Antonius Boekhorst, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

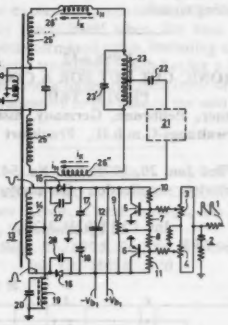
Continuation of Ser. No. 40,830, May 27, 1970. This application June 27, 1974, Ser. No. 483,615

Claims priority, application Netherlands, May 29, 1969, 6908229

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² H01J *29/56*

U.S. Cl. 315—371 **10 Claims**



1. A circuit arrangement for generating in a picture display device a sawtooth deflection correction current of line frequency having an amplitude varying at field frequency, said circuit comprising a line deflection current generator and a field deflection current generator for applying sawtooth currents of line and field frequency and having a substantially constant peak-to-peak amplitude to line and field deflection coils respectively. a modulator means controlled by the field deflection generator for obtaining the amplitude variation of field frequency of the sawtooth correction current of line frequency, the said sawtooth correction current of line frequency being a function of the instantaneous value of the line deflection current and of the field deflection current, said modulator including an electronic switch switching at the line frequency, an inductive circuit including said line deflection coil, said switch coupling said field generator to said inductive circuit during the line scan period, a capacitor, a resonant circuit comprising said capacitor and said inductive circuit during the line flyback period, the period of the resonant frequency of the resonant circuit being substantially twice the line flyback period, said electronic switch comprising two oppositely poled diodes that also generate supply voltages, said circuit further comprising an amplifier having an input adapted to receive said field frequency signal and an output coupled to said modulator, and means for applying said supply voltages due to the said diodes rectifying the peak amplitude during the line scan period of line pulses to said amplifier.

3,988,638

CIRCUIT ARRANGEMENT FOR GENERATING A FIELD DEFLECTION CURRENT

Antonius Hendrikus Hubertus Jozef Nillesen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

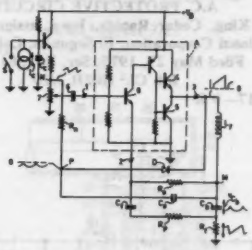
Filed Oct. 18, 1974, Ser. No. 516,002

Claims priority, application Netherlands, Oct. 31, 1973, 7314926

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 13, 1976

Int. Cl.² H01J *29/70, 29/72*

U.S. Cl. 315—388 **6 Claims**



1. A circuit arrangement for generating a sawtooth deflection current in a field deflection coil, said circuit comprising means for generating a sawtooth-shaped control signal; an amplifier having a first input terminal coupled to said generating means, a second input terminal, and an output means for coupling to said coil; low and high frequency feedback paths coupled to said second input terminal; a capacitor adapted to be coupled to said coil, whereby a parabolic voltage is developed thereacross; means for feeding back at least a portion of said parabolic voltage to said second terminal; and means for substantially eliminating overshoots and very low frequency oscillations in the mean value of said deflection current comprising an alternating current conducting field frequency clamping path means coupled between said output terminal and one of said input terminals for applying said parabolic voltage thereto.

3,988,639

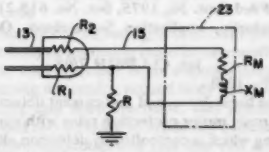
LOW POWER SYNCHRONOUS MOTOR AND LINE CORD THEREFOR

Ralph H. Preiser, La Salle; Frank W. Stellwagen, Stamford, both of Conn., and Anthony W. Rigazio, Oglesby, Ill., assignors to General Time Corporation, Thomaston, Conn.

Continuation of Ser. No. 405,551, Oct. 11, 1973, abandoned, which is a division of Ser. No. 261,485, June 9, 1972, abandoned. This application Sept. 5, 1975, Ser. No. 610,678

Int. Cl.² H02H *3/00*

U.S. Cl. 317—9 R **4 Claims**



1. An electrical connector for conveying current to an apparatus comprising:

a. a plug, said plug including

1. at least two prong means, each prong means having a pair of ends with one end received by said plug and the other end extending from said plug, said other end of

said prong means adapted for electrical connection to a source of current;

b. an electrical cord, said electrical cord including

1. at least two conductors therein, and means for insulating each of said conductors from each other conductor; and,

c. impedance means carried within said plug, said impedance means connecting each prong means to an individual one of said conductors thereby to limit said conveyed current through said electrical connector to a non-hazardous level of no more than about 5 milliamperes.

3,988,640

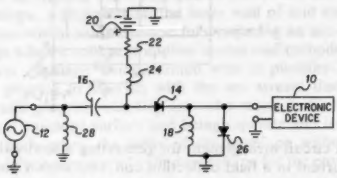
A.C. PROTECTIVE CIRCUIT

James R. King, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 27, 1975, Ser. No. 581,188

Int. Cl.² H02H *3/20*

U.S. Cl. 317—9 R **7 Claims**



1. An A. C. protective circuit for protecting an electronic device from excessive A. C. voltages, comprising:

a diode connected in series with the A. C. signal path to the electronic device;

a capacitor connected in series with said signal path;

D. C. power supply means connected to the terminals of said diode for forward biasing it, including means for blocking the passage of A. C. current;

threshold means connected in shunt with said signal path for providing a path to charge said capacitor from the A. C. signal with a polarity for reverse biasing said diode whenever the voltage across said threshold means exceeds a predetermined level, and

discharge means connected to the terminals of said capacitor for discharging it, including means for blocking the passage of A. C. current.

3,988,641

PHASE BREAKDOWN- AND NULL CURRENT-DETECTOR, ESPECIALLY FOR AN ELECTRONIC MOTOR PROTECTION RELAY POSSESSING CURRENT-DEPENDENT TRIGGERING

Michael Hentschel, Hannover, Germany, and Heinz Unterweger, Buchs, Switzerland, assignors to Sprecher & Schuh AG, Aarau, Switzerland

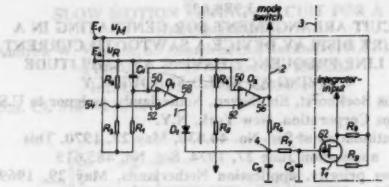
Filed Sept. 30, 1975, Ser. No. 618,210

Claims priority, application Switzerland, Oct. 1, 1974, 13218/74

Int. Cl.² H02H *7/08*

U.S. Cl. 317—13 B **9 Claims**

1. A phase breakdown- and null current detector, especially for an electronic motor protection relay with current-dependent triggering which is controlled by detection alternating-current voltages proportional to current values in the motor outer conductors, an electrical motor simulator simulating the thermal behavior of the motor by means of the charging operation of a capacitive storage, a controlled switching device for adjusting the motor simulator to different time-constants corresponding to the operating conditions of the motor the improvement comprising: a voltage comparator-circuit arrangement having an input side and an output side, circuit elements connected at the input side of the voltage comparator-circuit arrangement for the comparison of a mean value of a measurement voltage obtained by rectification of the detection alternating-current voltages with at lest one comparison voltage in such a manner that in the presence of a greater asymmetry of the detection alternating-current voltages than a predetermined asymmetry there is delivered an output signal



as a phase breakdown-reporting signal and in the case of detection alternating-current voltages smaller than a predetermined minimum value there is delivered an output signal as a null current-reporting signal, said voltage comparator-circuit arrangement containing a first output channel having a peak value-rectifier arrangement for the phase breakdown-reporting signals and a second direct output channel for the null current-reporting signals.

3,988,642

ELECTRONIC CUT OUT FOR A CIRCUIT TO BE PROTECTED

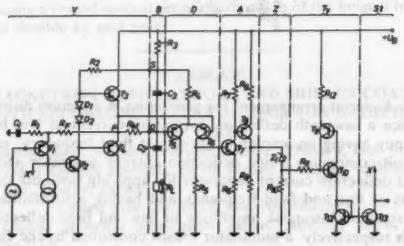
Dieter Herchner, Heilbronn, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Jan. 20, 1975, Ser. No. 542,276

Claims priority, application Germany, Feb. 1, 1974, 2404850

Int. Cl.² H02H *3/28*

U.S. Cl. 317—27 R **10 Claims**



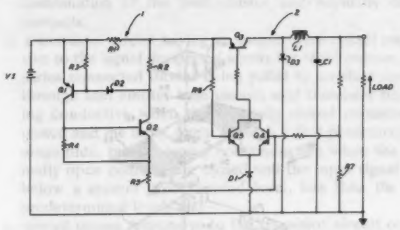
1. An electronic cut out for an amplifier circuit as protection against too high a load current, in which, for the disconnection, a load current exceeding a limit value is used directly, characterized in that a differential amplifier of at least two transistors is provided, the control electrodes of which are connected to two terminals of a measuring resistance lying in a load current circuit, in that said measuring resistance is so connected that the output direct voltage of the amplfier is applied across its two terminals, in that transistors of said differential amplifier are connected via a common dropping resistance to a potential, which varies in-phase with the dynamic output potential of the amplifier, in that said differential amplifier is connected via an adaptation stage to a switch stage, by which, on exceeding a defined threshold value, at the output of the switch stage, one or more subsequently connected current sources are driven, which are connected to said amplifier circuit in such a manner that the latter is disconnected at an excessive load current.

3,988,643

LATCH CIRCUIT

David Morris, Brooklyn, N.Y., assignor to Litton Business Systems, Inc., Morris Plains, N.J.

Filed Oct. 25, 1974, Ser. No. 518,103
Int. Cl.² H02H 7/20, 3/08
U.S. Cl. 317—33 VR 4 Claims



1. An electrical power supply comprising:

a switching voltage regulator circuit including a Schmitt trigger circuit means; and

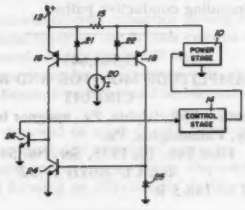
latch means, coupled to said Schmitt trigger circuit means, for turning the switching voltage regulator off when the load current exceeds a predetermined value and which automatically resets itself when the load current goes below said predetermined value, including a pair of opposite conductivity transistors, each having a base, emitter, and collector, and a diode coupled from the collector of one of said transistors to the base of the said other transistor.

3,988,644

CURRENT PROTECTION CIRCUIT

Kenneth Theodore Krone, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sept. 26, 1975, Ser. No. 616,986
Int. Cl.² H03K 5/20
U.S. Cl. 317—33 R 10 Claims



1. A current protection network for a device which is energized by a current supply, including in combination,

a sense resistor for connecting the device to the supply for applying current to the device,

a differential circuit including first and second transistors having emitter electrodes connected to the opposite ends of said sense resistor, said transistors having base electrodes which are connected together, and collector electrodes, current limiting means connecting said base electrodes to a reference point for the current supply, and a load circuit connected to said collector electrodes of said first and second transistors, and

first and second diodes connected between said emitter and base electrodes of said first and second transistors, respectively, whereby the current through said current limiting means is divided between said diodes, said diodes being connected with the same polarity as the emitter to base junctions of said transistors,

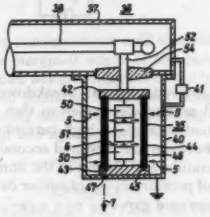
one of said transistors having a junction area different from that of said other transistor to control the current through said one transistor and thereby control the operation of said load circuit.

3,988,645

LAMINAR INSULATING MATERIAL FOR ELECTRICAL APPARATUS

Günther Luxa, and Johannes Kirch, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 14, 1975, Ser. No. 604,835
Claims priority, application Germany, Aug. 16, 1974, 2439838
Int. Cl.² H02H 3/22
U.S. Cl. 317—62 12 Claims



1. A fluid-insulated electrical apparatus comprising: first and second metal parts operable at first and second voltage potentials respectively, one of said voltage potentials being greater than the other one of said voltage potentials, said metal parts being separated from each other so as to define a region therebetween filled with the insulating fluid; and, a partition wall extending between said first and second metal parts for separating said region into separate regions on respective sides of said wall, said partition wall being a laminar insulation material including: two mutually adjacent cover layers conjointly defining a space therebetween, each of said cover layers being made of a material having a relatively large density; and, an intermediate insulating material filling out said space between said cover layers and being permeable to the fluid, said intermediate insulating material having a relatively low density.

3,988,646

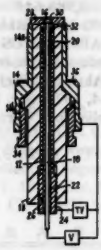
IGNITION DEVICES

Francis James Atkins, and Ian Albert Fisher, both of Leamington Spa, England, assignors to Associated Engineering Limited, England

Filed Nov. 20, 1974, Ser. No. 525,457
Claims priority, application United Kingdom, Nov. 29, 1973, 55443/73
Int. Cl.² H01T 13/46
U.S. Cl. 317—96 5 Claims

1. An ignition device including first, second and third electrodes, a first body of insulating material surrounding said first electrode, said third electrode being disposed outside said first body of insulating material, a second body of insulating material surrounding said third electrode, said second electrode surrounding said second body of insulating material, said first, second and third electrodes and said first and second bodies together defining a chamber within the device, said second electrode having a part closing one end of said chamber and being formed with an orifice therethrough, said first electrode extending across said chamber and into said orifice thereby to define an annular gap between said first and second electrodes, a first source of electrical potential connected across said first and second electrodes, said potential being insuffi-

cient to cause electrical breakdown of said annular gap, and means including a second source of electrical potential at a substantially higher potential than said first source to apply said substantially higher potential between one of said first and second electrodes and said third electrode to create a spark across said chamber and at least partly ionise the gas



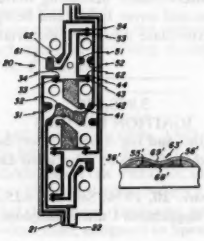
therein, thereby reducing the breakdown potential between said first and second electrodes so that said first source of electrical potential creates a high-current discharge across the annular gap between said first and second electrodes, causing a high-temperature arc plasma in the annular gap, the resulting increase of pressure in the chamber causing the arc plasma to project from said gap.

3,988,647

METHOD FOR MAKING A CIRCUIT BOARD AND ARTICLE MADE THEREBY

Donald A. Bolon, Scotia; Gary M. Lucas, Schenectady, both of N.Y., and Ralph L. Bartholomew, Painesville, Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 27, 1974, Ser. No. 509,893
Int. Cl.² G03B *15/02*
U.S. Cl. 317—101 B **11 Claims**



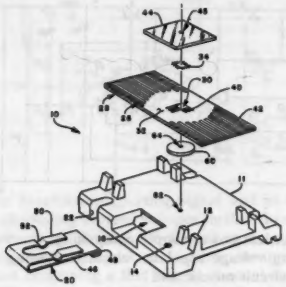
1. A circuit board suitable for activating high voltage flash lamps consisting of a nonconductive substrate having patterned electrically conductive circuitry on its surface at a thickness of up to about 5 mils with a specific resistivity of less than 10 ohm-cm, where said patterned electrically conductive circuitry is comprised of an organic resin matrix and a particulated electrically conductive metal containing material, and which electrically conductive circuit suffers less than a 2% weight loss based on the weight of electrically conductive circuitry when baked for 60 minutes at a temperature of 70° C., where said particulated electrically conductive metal containing material is substantially free of metal containing material having an aspect ratio of diameter to thickness of a value greater than 20.

3,988,648

PROTECTIVE CARRIER FOR MICROCIRCUIT DEVICES

Lyle A. Robinson, Raytown, Mo., assignor to The United States of America as represented by the United States Research and Development Administration, Washington, D.C.

Filed July 18, 1975, Ser. No. 597,270
Int. Cl.² H05K *1/04*
U.S. Cl. 317—101 CC **5 Claims**



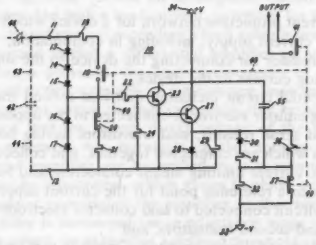
1. A carrier for use in handling and testing operations on microcircuit devices having beam leads, said carrier including a base, a flexible circuit element on said base having an aperture therethrough adapted to receive one of said microcircuit devices, a plurality of electrically conductive paths on a surface of said element with each of said paths having an inner end adjacent said aperture and an outer end remote therefrom for contacting with said inner ends corresponding ends of said beam leads of said microcircuit devices, a cover member disposed generally over said microcicuit device and said beam leads, retaining means for compressing said cover member against said beam leads and retaining said beam leads in a fixed orientation with respect to said correspondng paths and towards electrial contact therewith, and a compressible member beneath said aperture and adjacent areas of said flexible circuit element and of a thickness to deflect said element areas upwardly toward a said device and beam leads thereof and provide firm electrical contact between said beam leads and said corresponding conductive paths.

3,988,649

SIGNAL AMPLITUDE MONITOR AND RELAY DRIVER CIRCUIT

Sandor Mentler, Philadelphia, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Feb. 10, 1975, Ser. No. 548,848
Int. Cl.² H01H *47/32*
U.S. Cl. 317—148.5 R **3 Claims**



1. A circuit for operating a relay in response to an input signal comprising:

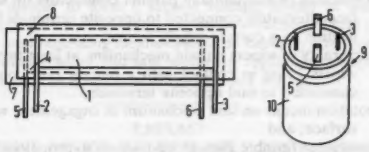
a. a plurality of diodes connected in series with a first resistor and normally closed contacts of the relay, said series combination being driven by the input signal;
b. a second resistor connected in parallel with the series connected diodes through normally open contacts of the relay;
c. a third resistor connected in parallel circuit with the combination of the first resistor and normally closed contacts;
d. a transistor circuit having its emitter-base circuit responsive to the signal developed across the thrid resistor, said series connected diodes being poled to conduct current through said emitter-base circuit, said transistor becoming conductive when the normally closed contacts are closed and the input signal exceeds a first predetermined magnitude, but becoming nonconductive when the normally open contacts are closed and the input signal falls below a second predetermind level, less than the first predetermined level; and
e. circuit means responsive to the transistor circuit output for energizing the relay when the transistor is conductive and deenergizing the relay when the transistor is nonconductive.

3,988,650

ALUMINUM-ELECTROLYTIC CAPACITOR HAVING A LOW IMPEDANCE AND LOW INDUCTANCE

Franz Fritze, Heidenheim-Schnaitheim, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 30, 1975, Ser. No. 545,541
Claims priority, application Germany, Feb. 8, 1974, 2406141
Int. Cl.² H01G *9/00, 9/16;* B01J *17/00*
U.S. Cl. 317—230 **10 Claims**



1. An aluminum-electrolytic capacitor having a low impedance and a low inductance for use in filter circuits comprising:
a winding of anode and cathode foil layers;
an intermediate paper layer saturated with the operating electrolyte disposed between said anode and cathode foil layers;
a pair of taps disposed on each of said anode and cathode foil layers for input and output of current;
said pair of taps on each layer being disposed in spaced relation and forming an effective RC lattice network.

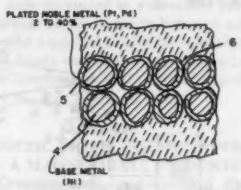
3,988,651

MONOLITHIC CERAMIC CAPACITOR

Jerome Jay Hertz, Erie, Pa., assignor to Erie Technological Products, Inc., Erie, Pa.

Filed May 23, 1975, Ser. No. 580,405
Int. Cl.² H01G *1/01*
U.S. Cl. 317—258 **9 Claims**

1. A ceramic capacitor comprising a sintered ceramic monolith having electrodes in a capacity relation to each other through portions of said monolith, said electrodes comprising fritless patterns of pigment size particles of base metal individually coated with noble metal said coating comprises a minor percent of the weight of said particles, said patterns being margined inward from edges of said monolith, said particles being compressed against said monolith and against each other, said capacitor having been formed by a process involving stacking binder containing sheets of green ceramic and having painted thereon said fritless patterns margined inward from edges of said sheets, said fritless patterns comprising said pigment size particles dispersed in a vehicle for adhering the particles to the green ceramic, and ceramically firing the stacked sheets into a monolith in a reducing atmosphere, said binder and vehicle being eliminated during ceramic firing, said



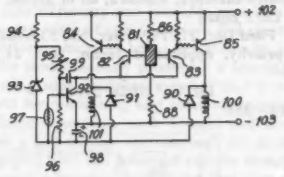
green ceramic being converted into said monolith during said ceramic firing with margined edges of the ceramic sintered together, said particles being indifferent to the balance of said monolith and to said coatings during said firing and the ceramic shrinkage during said firing compressing said particles against the monolith and against each other.

3,988,652

STABILIZED BRUSHLESS MOTOR DRIVE CIRCUIT

Takeshi Endo; Yoshihiro Mitsui, and Hiroshi Kamakura, all of Matsumoto, Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo and Shinshu Seiki Kabushiki Kaisha, both of, Japan

Continuation-in-part of Ser. No. 372,564, June 22, 1973, Pat. No. 3,881,142. This application Apr. 9, 1975, Ser. No. 566,496
Claims priority, application Japan, June 22, 1972, 47-61794
Int. Cl.² H02K *29/00*
U.S. Cl. 318—138 **10 Claims**



1. In a brushless motor circuit having at least one hall effect element for controlling the duration of application of driving current to a driving coil, the improvement comprising drive transistor means adapted to receive signals from said hall effect element and in response thereto control the amplitude of the current applied to the drive coil for the duration determined by said hall effect element, control transistor means connected by the emitter-collector path thereof to said drive transistor means to control the amplitude of the current supplied to said driving coil thereby; means for detecting a voltage proportional to the rotational speed of said brushless motor; means for producing a fixed reference voltage; means connecting said fixed reference voltage and said voltage proportional to the rotational speed of said rotor in series to the base of said control transistor means for linearly controlling the amplitude of the current supplied to said driving coil by said drive transistor means in response to variations in the voltage proportional to the rotational speed of said motor to maintain said speed at a predetermined level.

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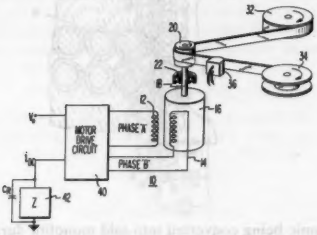
REDUCTION OF HUNTING IN SYNCHRONOUS MOTOR

Stanley Paul Clurman, Cherry Hill, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 133,572, April 13, 1971, abandoned. This application Apr. 20, 1972, Ser. No. 245,909

Int. Cl.[2] H02P 5/28

U.S. Cl. 318—184 2 Claims



1. In combination: a synchronous motor comprising a stator and a rotor characterized in that said rotor may oscillate about an average angular position relative to the field of said stator as said rotor rotates;

electronic drive means responsive to a source of direct potential for producing an alternating signal coupled to said stator for causing said rotor to rotate;

means responsive to changes in a parameter of said potential received by said drive means for producing a signal proportional to said parameter; and

means coupled to said drive means and responsive to said signal proportional to said parameter for changing one of the amplitude and phase of said alternating signal in a sense to reduce hunting of said rotor.

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MINIATURE BRUSHLESS MOTOR

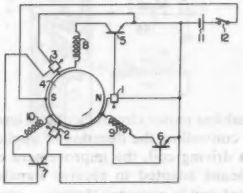
Tadashi Takahashi; Kazuo Onishi; Mituru Sato, all of Hitachi, and Junshiro Inamura, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 17, 1974, Ser. No. 533,702

Claims priority, application Japan, Dec. 21, 1973, 48-142478

Int. Cl.[2] H02K 29/00

U.S. Cl. 318—254 5 Claims



1. A miniature brushless motor comprising a plurality of driving coils disposed around a permanent magnet rotor for driving said permanent magnet rotor, at least a first portion of said permanent magnet rotor which is located opposite to said driving coils being magnetized through a first magnetization angle, a plurality of magnetically responsive element means disposed around said permanent magnet rotor for detecting the rotating position of said permanent magnet rotor, and means for selectively supplying current to said driving coils under control of a signal supplied thereto upon detection of the rotational position of said permanent magnet rotor by said magnetically responsive element means, each said magnetically responsive element means generating said control signal to said selective means for supplying its associated driving coil with a current having a conduction angle smaller than the first magnetization angle of said first magnetized portion of said permanent magnet rotor.

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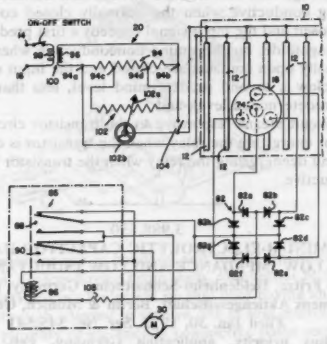
APPARATUS TO CONTROL THE DIRECTION OF MOVEMENT OF A MECHANISM

Henry A. Sherwood, 30 North Road, Short Hills, N.J. 07078

Filed Oct. 21, 1974, Ser. No. 516,535

Int. Cl.[2] H02P 7/80

U.S. Cl. 318—257 29 Claims



1. An apparatus for controlling the direction of movement of a mechanism on a surface comprising:

a plurality of substantially parallel conductors on said surface alternately connected to opposite terminals for connection to a current supply source;

a plurality of wipers on said mechanism, at least two of said wipers being in contact with a pair of said conductors connected to said opposite terminals;

rotation means on said mechanism in engagement with said surface; and

means energizable through said wipers to propel said mechanism across the surface, said energizable means comprising a motor and including a control means on said mechanism between said motor and said rotation means for operating said rotation means to vary the direction of movement of said mechanism in response to the voltage across alternate conductors.

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MOTOR SPEED CONTROL FOR POWER TOOL

Albrecht Schnizler, Jr., Nurtingen, and Dietrich Holzwarth, Pfullingen, both of Germany, assignors to Metabowerke KG Closs, Rauch & Schnitzler, Nuertingen, Germany

Filed July 3, 1974, Ser. No. 485,732

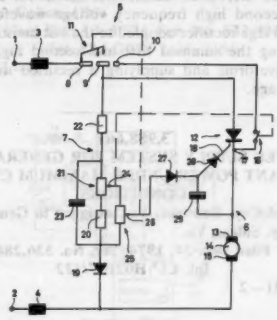
Claims priority, application Germany, July 4, 1973, 2334013

Int. Cl.[2] H02P 7/28

U.S. Cl. 318—345 12 Claims

1. In a hand-held power tool of the type provided with a manually activated pressure switch for initiating tool operation, in combination, an electric motor; a first speed selector settable to a plurality of different top-speed settings; a second speed selector connected to and moved by said manually activated pressure switch from a normal zero-speed setting corresponding to non-activation of said pressure switch to a top-speed setting corresponding to full depressing of said pressure switch, through a plurality of intermediate settings corresponding to intermediate degrees of depressing of said pressure switch; and motor-energizing circuit means connected to said motor and to said first and second selectors and operative when said second selector is progressively moved

from its normal zero-speed setting through said intermediate settings to its top-speed setting for effecting a corresponding progressive increase in the energization of said motor such as to cause the motor speed to progressively rise from zero to a top speed corresponding to the setting of said first selector, wherein said first selector and said second selector respectively comprise first and second potentiometers respectively comprised of first and second potentiometer resistors and first and second potentiometer wipers slidable along the respective resistors, the setting of each wiper constituting the setting of the respective speed selector, and wherein said motor-energizing circuit means comprises two voltage supply lines, means connecting said first potentiometer resistor across said two voltage supply lines to form a first voltage divider at whose wiper appears a first voltage determinative of top speed, and means connecting said second potentiometer resistor between said first potentiometer wiper and one terminal of said first voltage divider to form a second voltage divider at whose wiper appears a second voltage equal to a fraction of said first voltage, and regulating means connected between said second potentiometer wiper and said motor for regulating the speed of said motor as a function of said second voltage.



3,988,657

INDUCTIVE DEVICE FOR PRECISELY POSITIONING A MOVABLE MEMBER

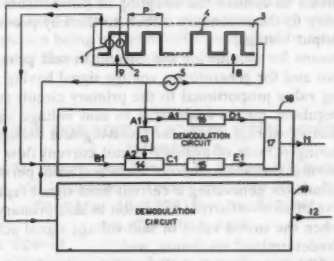
Guy Prival, Chilly Mazarin; Jacques Michel Hennequin, Saint-Maurice, and Yves-Jean Francois Brette, Sevres, all of France, assignors to Societe Industrielle Honeywell Bull, Paris, France

Filed Dec. 30, 1971, Ser. No. 215,967

Claims priority, application France, Dec. 31, 1970, 70.47579

Int. Cl.² G05B *11/18*

U.S. Cl. 318—594 **5 Claims**



1. An inductive device for precisely positioning a movable member along a rectilinear path, wherein a motor is provided for driving said movable member along said path, comprising: a plane conductive circuit forming windings, said windings comprising, in turn, a plurality of equispaced parallel elements, means for supplying said plane circuit with a relatively high-frequency electric current, said plane circuit being oriented parallel to said path and attached to said movable member, a plurality of magnetic signal receiving heads each provided with an air gap in a plane parallel to said plane conductive circuit disposed along said plane circuit, the distance between said air gaps measured in a direction parallel to said path being a function of the distance between adjacent ones of said elements, and a control circuit for receiving the signals generated by said heads and generating, a signal for controlling said motor in response to said received signals.

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ELECTROMAGNETIC DRIVE ASSEMBLY FOR ROTARY BODIES USING A MAGNETICALLY MOUNTED ROTOR

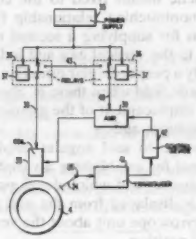
Peter Meinke, Grossinzemoos, and Gerhard Flachenecker, Ottobrunn, both of Germany, assignors to Maschinenfabrik Augsburg-Nurnberg AG, Germany

Filed July 29, 1974, Ser. No. 492,712

Claims priority, application Germany, July 27, 1973, 2338307

Int. Cl.² G05F *1/00*; F16C *39/06*

U.S. Cl. 318—647 **35 Claims**



1. An electromagnetic drive assembly comprising a stationary member and a rotatable member of a magnetizable material, one of said stationary and rotatable members being disposed within the other of said stationary and rotatable members, said stationary member being provided with at least two coil means for simultaneously producing a rotating magnetic field for driving said rotatable member and a nonrotating magnetic field for positioning said rotatable member relative to said stationary member, each of said coil means being supplied with a first current therethrough for producing the rotating magnetic field and a second current through at least a portion thereof supperimposed on the first current for producing the nonrotating magnetic field, sensing means for sensing the spacing between said stationary and rotatable members and providing an output indicative thereof, and control means for varying the second current and thereby the nonrotating field for maintaining a predetermined spacing between said stationary and rotatable members.

3,988,659

MERIDIAN SEEKING INSTRUMENT

Leonard R. Ambrosini, Arlington, Va., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Continuation of Ser. No. 882,002, Dec. 4, 1969, which is a continuation of Ser. No. 529,325, Feb. 23, 1966, Pat. No. 3,512,264. This application June 19, 1972, Ser. No. 263,928

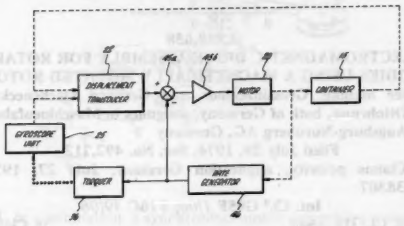
Int. Cl.² B64C *17/02*

U.S. Cl. 318—648 **9 Claims**

1. A two-degree-of-freedom meridian seeking system including a pendulously supported gyroscope having a predetermined null position relative to a gyroscope container, the gyroscope is pendulously supported for two-degree-freedom-

of-movement by a suspension band and further including means rotatably mounting the container on a frame for rotation about a vertical axis, which container surrounds the suspended gyroscope unit and also includes means for generating an electrical control signal which is representative of an angular displacement relative to a null position, which displacement is caused by rotational movement about the vertical axis between the gyroscope unit and the container, said system comprising:

first magnetic means fixed to the gyroscope unit for supplying a first reference magnetic field perpendicular to the vertical axis;



second magnetic means fixed to the container and interspaced in nontouching relationship from the first magnetic means for supplying a second magnetic field perpendicular to the vertical axis and inductively coupled in substantially a perpendicular direction with the first reference magnetic field when there is, about the vertical axis, no angular displacement of the gyroscope unit away from said null position; and

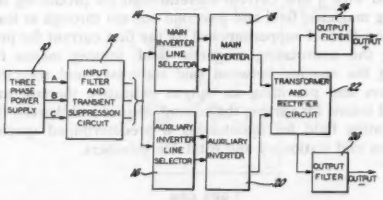
means responsive to said angular displacement electrical control signal for establishing a variable intensity in said second magnetic field which develops a torque when the gyroscope is displaced from the null position tending to move the gyroscope unit about the vertical axis and back to said null position.

3,988,660

CIRCUIT FOR RECTIFYING A THREE-PHASE ALTERNATING SIGNAL

David E. Ruch, and Lowell H. Koski, both of Goleta, Calif., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 1, 1975, Ser. No. 600,946
Int. Cl.² H02M 5/293
U.S. Cl. 321—2 **2 Claims**



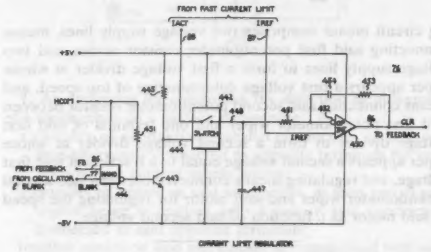
1. A lightweight rectifier for converting a three-phase alternating voltage output from a three-phase supply to a rectified unidirectional output voltage comprising: a three-phase full-wave bridge rectifier coupled with the three-phase supply for converting the three-phase alternating voltage to a main unidirectional supply voltage; a line selector having a pair of output terminals, the line selector including means for coupling the 0° to 30°, 60° to 120° and 150° to 180° segments of each cycle of each phase of the three-phase alternating voltage beginning at the negative to positive transition of the respective phase to one of the output terminals and coupling the 180° to 210°, 240° to 300° and 330° to 360° segments of each cycle of each phase of the three-phase alternating voltage beginning at the negative to positive transition of the respective phase to the other one of the output terminals, the voltage between the pair of output terminals comprising an auxiliary unidirectional supply voltage; a main inverter coupled to the three-phase full-wave bridge rectifier for chopping the main unidirectional supply voltage into a first high frequency voltage waveform; an auxiliary inverter coupled to the output terminals of the line selector for chopping the auxiliary unidirectional supply voltage into a second high frequency voltage waveform at the frequency of the first high frequency voltage waveform and synchronized therewith; transformer means for summing the first and second high frequency voltage waveforms; and a full-wave bridge rectifier coupled to the last mentioned means for rectifying the summed first and second high frequency voltage waveforms and supplying a rectified unidirectional output voltage.

3,988,661

POWER SUPPLY SYSTEM FOR GENERATING CONSTANT POWER UNDER MAXIMUM CURRENT CONDITIONS

Daniel J. McCoy, Roanoke, Va., assignor to General Electric Company, Salem, Va.

Filed Dec. 24, 1974, Ser. No. 536,288
Int. Cl.² H02H 7/122
U.S. Cl. 321—2 **6 Claims**



1. An electric power supply system comprising:

a plurality of power supplies having their outputs connected in parallel to provide a constant output voltage to an electrical load, each of said power supplies capable of independent operation and each being of a current capacity sufficient to drive said load, each of said power supplies including;

a. a controllable power inverter including primary and secondary circuits for providing the output voltage to said electrical load and switch means responsive to pulse drive signals of variable width and spacing to control periods of current flow through said primary circuit to control the coupling of power from he primary to the secondary circuit to thereby provide said output voltage,

b. means for monitoring the current in said primary circuit and for generating a voltage signal having an analog value proportional to the primary circuit current,

c. regulator means responsive to said voltage signal including storage means for receiving said voltage signal during periods of primary circuit current flow and for storing the value thereof between said periods and means for generating a current limit signal representative of an overcurrent condition in said primary circuit when the stored value of said voltage signal achieves a predetermined maximum, and,

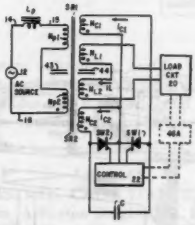
d. additional means including drive means for producing said drive signals, said additional means responsive to said current limit signal for controlling the width and spacing of said pulse drive signals to thereby decrease the output voltage and regulate the current at substan-

tially said predetermined maximum in the primary circuit of only that power supply generating a current limit signal to thereby allow constant voltage to be supplied to said load from those power supplies not generating a current limit signal.

3,988,662
VARIABLE FLUX-RESET FERRORESONANT VOLTAGE REGULATOR

Patrick L. Hunter, Columbus, Ohio, assignor to North Electric Company, Galion, Ohio

Filed Dec. 13, 1974, Ser. No. 532,471
Int. Cl.² G05F *1/38, 1/64*
U.S. Cl. 323—48 **17 Claims**



1. A regulator device comprising a transformer structure having magnetic core means which has at least a first and second magnetic path, primary winding means having first and second predetermined portions thereof respectively wound on said first and second magnetic paths of said magnetic core means, secondary winding means wound on said magnetic core means including load winding means having first and second predetermined portions thereof respectively wound on said first and second magnetic paths for providing an output voltage to a load which is proportional to the rate of change of flux in said first and second magnetic paths, means for connecting said primary winding means to an alternating current source including first decoupling means for decoupling said source from said load, a first capacitor winding wound on said first magnetic path and a second capacitor winding wound on said second magnetic path, capacitor means, second decoupling means for decoupling said first capacitor winding from said second capacitor winding, and switching means operative at a selected time in a first half cycle of the load voltage to couple said capacitor means across said first capacitor winding, and operative at a selected time in a second half cycle of the load voltage to couple said capacitor means across said second capacitor winding, to effect resonant commutation to reverse the charge of said capacitor means in each half cycle, the characteristic of said resonant commutation being independently controlled by the design of said second decoupling means.

3,988,663
LOCATOR FOR METALLIC PIPE WITH AC SIGNALS IMPRESSED

Carlton M. Slough, and Edward B. Selden, III, both of Richmond, Va., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 19, 1975, Ser. No. 559,841
Int. Cl.² G01V *3/08*
U.S. Cl. 324—3 **5 Claims**

1. In combination with a buried metallic pipe to be located, said pipe having AC signals impressed thereon being from AC operated cathodic protection currents or ground currents from AC operated equipment or induced currents from power lines or the like and said impressed AC signals being about 60 or 120 or 180 or 240 Hertz,

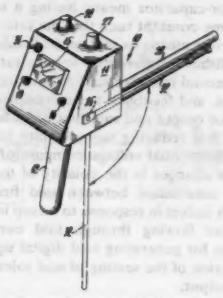
a pipe locator comprising solely

a short pick-up coil having an axial length of about 6½ inches and a ferromagnetic core associated therewith,

said coil comprising about 5000 turns of insulated wire wound on a ferrite core of about five-sixteenths inch diameter

said coil and core being mounted in a metallic protective shield,

a tuned bandpass amplifier being tuned to about 180 Hertz and having the input thereof connected to said coil,



said amplifier comprising three stages of solid state amplifiers,

said first two stages being connected as Wien-bridge bandpass filter amplifiers,

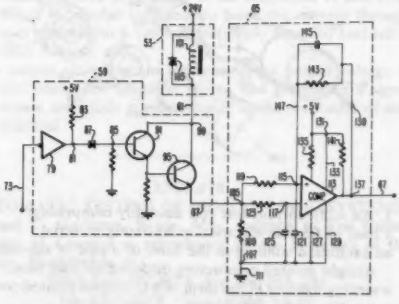
said third stage being connected as a straightforward amplifier, and

means for detecting the output of said amplifier in order to permit a directional determination from said locator to said pipe by nulling effects of said AC signals in said coil.

3,988,664
SYSTEM FOR PREDICTING OR DETECTING A FAULT IN A SOLENOID UTILIZATION SYSTEM

Jack Beery, Farmington, and Daniel A. Wisner, Milan, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Feb. 18, 1975, Ser. No. 550,595
Int. Cl.² G01R *31/02*
U.S. Cl. 324—28 R **2 Claims**



1. A fault detection system for use in a system employing a solenoid, said fault detection system comprising:

means for detecting the seating of said solenoid including current-sensing resistor means coupled to the coil of said solenoid for sensing the current flowing therein, and means responsive to the characteristic cusp in the waveform of the current flowing in said current-sensing resistor means which occurs in response to the seating of said

solenoid for generating a digital output signal indicative of the detection of the seating of said solenoid comprising differential voltage comparator means having a first and second input and a comparator output, first resistor-capacitor means coupled to the first input of said differential voltage comparator means and coupled across said current-sensing resistor means, said first resistor-capacitor means having a first RC time constant, second resistor-capacitor means coupled to the second input of said differential voltage comparator means and coupled across said current-sensing resistor means, said second resistor-capacitor means having a second characteristic RC time constant such that the ratio of said first resistor-capacitor means to said second resistor-capacitor means establishes a differential voltage ratio between said first and second inputs of said differential voltage comparator means, and feedback means coupled between said comparator output and said first input for preventing oscillations and reducing susceptibility to noise, and wherein said differential voltage comparator means is responsive to the changes in the polarity of the differential voltage ratio established between said first and second input which occurs in response to a cusp in the waveform of the current flowing through said current-sensing resistor means for generating said digital signal indicative of the detection of the seating of said solenoid at said comparator output;

means for establishing a predetermined time interval during which the detected seating of said solenoid will be deemed to be acceptable; and

means responsive to the detection of a solenoid seating outside of said predetermined time interval for passing a signal indicative of the occurrence of a fault.

3,988,665

EDDY CURRENT TEST COIL ASSEMBLY USING PRINTED CIRCUIT CONDUCTOR MEANS

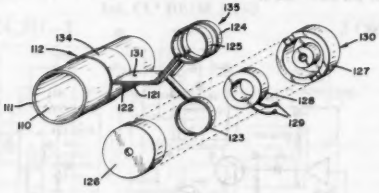
Peter Neumaier, and Helmut Reitz, both of Metzingen, Germany, assignors to Institut Dr. Friedrich Forster, Prufgeratebau, Reutlingen, Germany

Filed Mar. 12, 1975, Ser. No. 557,639

Claims priority, application Germany, May 29, 1974, 2426270

Int. Cl.² G01R *33/12*

U.S. Cl. 324—40 **2 Claims**



1. An eddy current test coil assembly comprising:

a base of flexible electrically insulating material;

an excitation winding in the form of a pair of substantially straight printed conductors disposed on said base;

a sensing winding in the form of a U-shaped printed conductor disposed on said base;

a first and a second transformer winding in the form of respective substantially straight printed conductors disposed on said base;

conductive means in the form of substantially straight conductors disposed on said base and connecting said excitation winding conductors with said first transformer winding conductors;

all of said conductors, when said base is flat with exception of the base of the U-shaped conductor being substantially parallel to one another and when said base is looped for joining said sensing winding to said second transfomer winding being arranged and connected to provide loops for forming an excitation winding loop, a sensing winding loop, and a respective first and a second transformer winding loop.

3,988,666

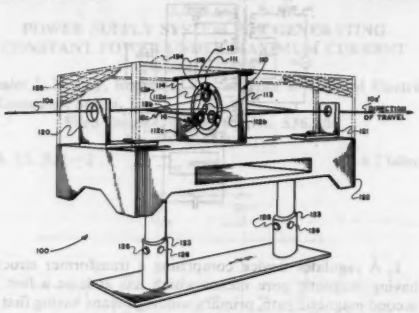
MULTIPLEX CABLE INSULATION FAULT LOCATOR SYSTEM WITH ELECTRICAL CONDUCTING GUIDES MOUNTED ON A ROTATING DISC

Bobby A. Rowland; Dwight H. Durham, and O. Leon Thomas, all of Carrollton, Ga., assignors to Southwire Company, Carrollton, Ga.

Filed Jan. 12, 1976, Ser. No. 648,215

Int. Cl.² G01R *31/12*

U.S. Cl. 324—54 **12 Claims**



8. A fault locator device for detecting insulation faults in multiplex cable having multiple strands of insulated conductors therein twisted together comprising:

a rotatable disc structure having a series of elongated hollow tubular conductive members therein insulated from each other and symmetrically and evenly disposed about its center of rotation, said disc structure having an entry side and an exit side and having an electrical commutator system adapted to be coupled to a high voltage source electrically connected to said conductive members for setting up an electromagnetic field within each said conductive members; and

support means for supporting said disc structure allowing the rotation thereof, the insulated strands of the multiplex cable being untwisted from each other on the entry side of said disc structure and being fed each individually through a separate one of said conductive members, the insulated strands being retwisted on the exit side of said disc structure as the multiplex cable is passed through said disc structure.

3,988,667

NOISE SOURCE FOR TRANSFER FUNCTION TESTING

Peter R. Roth, and Jean-Pierre D. Patkay, both of Los Altos, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 6, 1975, Ser. No. 555,773

Int. Cl.² G01R *27/00*

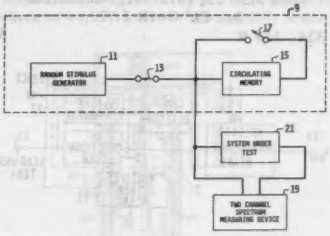
U.S. Cl. 324—57 N **16 Claims**

1. A method of generating a group of periodic random stimuli for application to a system under test, the method comprising the steps of:

a. generating a finite record length random stimulus of T seconds in length;

b. storing the finite record length random stimulus generated in step a;

c. repeatedly applying the stored finite record length random stimulus to the system under test a selected numer of times; and



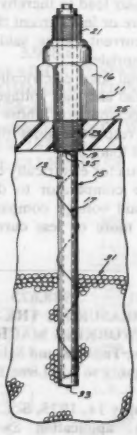
d. repeating steps a through c, and for each repetition generating and applying to the system under test a periodic random stimulus that is uncorrelated with all prior periodic random stimuli.

3,988,668

ANTISTATIC CAPACITANCE PROBE

Elton W. Bowers, Arlington Heights, Ill., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Oct. 17, 1975, Ser. No. 623,397
Int. Cl.² G01R 27/26
U.S. Cl. 324—61 P **5 Claims**



1. Antistatic capacitance probe for receipt in a port formed in the wall of a vessel and comprising:

an electrically conductive gland for receipt in said port;

a center conductor mounted on one end of said gland and projecting therefrom;

an insulator enclosing the projecting extremity of said conductor;

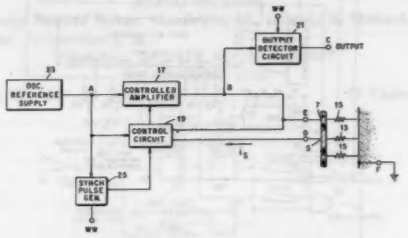
an elongated equalizing conductor connected on one end to the free extremity of said insulator and extending along the exterior of said insulator and connected on its opposite end to said gland, whereby static electrical charges imposed on said insulator along the length thereof will be conducted to said equalizer conductor and to said gland to equalize the electrostatic charge along said insulator.

3,988,669

AUTOMATIC CONTROL AND DETECTOR FOR THREE-TERMINAL RESISTANCE MEASUREMENT

George E. Fasching, Morgantown, W. Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 15, 1975, Ser. No. 605,370
Int. Cl.² G01R 27/14
U.S. Cl. 324—65 R **6 Claims**



1. In a resistance measuring device for measuring the resistance of bulk material including a probe arrangement having a first electrode electrically coupled to said material for sensing the current through said material, a second electrode spaced in close proximity to said first electrode and electrically coupled to said material for inducing a voltage across said material between said second electrode and a third ground electrode, a circuit for measuring the resistance of said material, comprising:

a reference voltage source;

a control circuit means connected to said first electrode for geneating a reference current in response to said voltage source and comparing said reference current with the current flowing through said material and generating an analog error signal proportional to the difference therebetween;

a controlled amplifier means having an output connected to said second electrode for amplifying the signal from said voltage source in response to the magnitude of said error signal to a value sufficient to force the current through said material to a value substantially equal to said reference current; and

an output circuit means for sensing the output voltage of said controlled amplifier means and generating a signal whose amplitude is proportional to the resistance of said material.

3,988,670

AUTOMATIC TESTING OF DIGITAL LOGIC SYSTEMS

Michael C. Gariazzo, Bowie, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 15, 1975, Ser. No. 568,234
Int. Cl.² G01R 15/12; G06F 15/20
U.S. Cl. 324—73 AT **4 Claims**

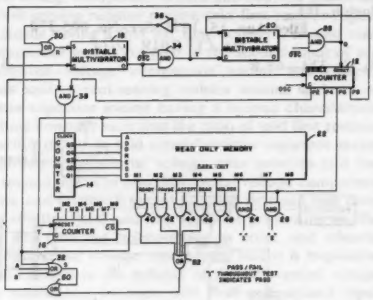
1. An automatic testing device for digital sequential logic devices comprising:

a read only memory programmed with a series of inputs and expected outputs;

logic means for advancing said read only memory through various stages and

a plurality of EXCLUSIVE-OR gates coupled to the outputs of said read only memory and said devices for comparing

the output of said read only memory with the outputs of said devices under test;



whereby any device whose output does not correspond to that of said read only memory output may be noted.

3,988,671

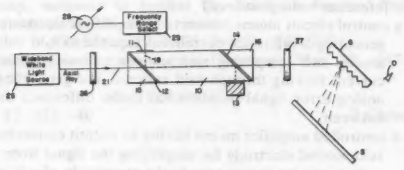
METHOD AND APPARATUS FOR COLINEAR ACOUSTO-OPTIC RF SPECTRUM ANALYSIS

Melvin E. Pedinoff, Canoga Park, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 17, 1975, Ser. No. 558,761

Int. Cl.² G01R 23/16

U.S. Cl. 324—77 K **10 Claims**



1. The method of analyzing the frequency spectrum of a radio frequency signal comprising the steps of:

a. deriving from said radio frequency signal an acoustic wave having frequency components respresentative of tne frequency components of said radio frequency signal;

b. simultaneously transmitting said acoustic wave and a beam of polarized wideband white light colinearly through an optically anisotropic crystal to produce acous-to-optic diffraction of the plane of polarization of those frequency components of said light beam which bear a predetermined relationship to the frequency components present in said acoustic wave;

c. passing said polarization diffracted light beam through a polarization analyzer to transmit only those frequency components which have been polarization diffracted;

d. dispersing the light output of said polarization analyzer by deflecting each of the frequency components thereof by an amount which is proportional to the frequency of said component; and

e. displaying an image of said dispersed components to provide an analysis of the spectrum of said radio frequency signal.

3,988,672

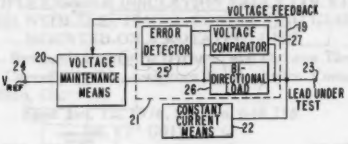
PARAMETRIC TESTER FOR SEMICONDUCTOR DEVICES

Brooks E. Cowart, Mountain View, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Mar. 13, 1975, Ser. No. 558,185

Int. Cl.² G01R 31/22

U.S. Cl. 324—158 R **6 Claims**



1. A tester for conducting parametric tests on a semiconductor device having a plurality of electrical leads, said tester comprising:

a. a constant current source means having an output terminal electrically coupled to a particular lead of the semiconductor device under test, and being disposed for supplying a constant current to the lead;

b. voltage maintenance means having a first input terminal coupled to a reference voltage source, a second feedback input terminal coupled to the particular lead of the device under test, and an output terminal electrically coupled to the particular lead of the device under test for maintaining the lead at a specified voltage; and,

c. a current direction-sensing means electrically coupled between said voltage maintenance means and the particular lead of the device under test to detect the direction of current flow between said voltage maintenance means and the particular lead to thereby determine whether the lead draws more or less current than current supplied by said constant current source; said current direction-sensing means comprising:

i. a bidirectional load electrically coupled between the particular lead and said voltage maintenance means;

ii. a voltage comparator whose inputs are electrically coupled to respective ones of the terminals of said bidirectional load; and

iii. an error detector electrically coupled to the output of said voltage comparator to determine whether said output of said voltage comparator signifies that said lead draws more or less current than said constant current.

3,988,673

DEVICE FOR MEASURING THE STOPPING TIME OF WORKING MACHINES

Lars-Erik Svensson, Tullinge, and Sylvi Rodin, Huddinge, both of Sweden, assignors to AB Liros Elektronik, Malmo, Sweden

Filed May 14, 1975, Ser. No. 577,253

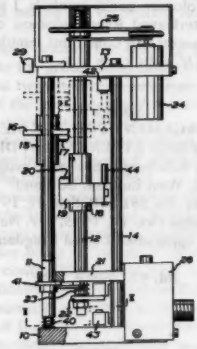
Claims priority, application Sweden, May 15, 1974, 7406479

Int. Cl.² G04F 8/00

U.S. Cl. 324—181 **4 Claims**

1. A device for measuring the stopping time of working machines, for example, presses, such as edging presses and eccentric presses and which comprises a means combined with the press, for example, a runner, which is arranged, in the working cycle of the press, to actuate an abutment by entrainment, comprising a first abutment means slidably mounted on a guide, provided with a first contact means and actuated by a runner, the abutment means, on being actuated, indirectly cooperating with a first switching means arranged to break the operating current to the working machine, and with a second switching means which, fully synchronically with the first switching means, breaks the current to the short-circuited

time meter, which thus starts a working cycle, and a second abutment means slidably mounted on a guide and provided with a second contact means, the abutment means being arranged to be slidably entrained by the first abutment means, thereby to establish contact between the first and the second contact means, and being also arranged to be driven by its own power source at a speed lower or substantially lower than the



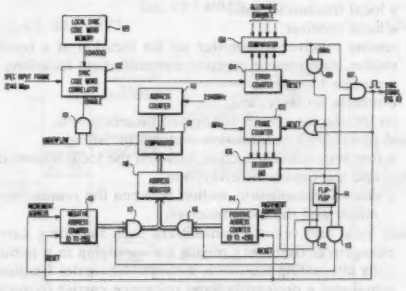
speed of the runner at the moment of contact with the first abutment means, the first and second contact means also serving as a third switch for breaking the contact between the abutment means and thereby the current to the time measurement device, when the working machine and both the runner of the working machine and the first abutment means are arrested and the second abutment means continues, actuated by the power source.

3,988,674

FRAME SYNCHRONIZATION IN SPEECH PREDICTIVE ENCODED COMMUNICATION SYSTEM

Joseph Albert Sciulli, Rockville, Md., assignor to Communications Satellite Corporation (Comsat), Washington, D.C.

Filed Mar. 17, 1975, Ser. No. 559,206
Int. Cl.² H04J *3/06*
U.S. Cl. 179—15 BS **10 Claims**



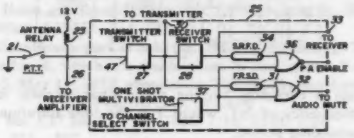
1. In a digital communications system wherein information from a plurality of voice circuits at a transmitting station may be transmitted at a minimum bit rate to a receiving station via a transmission path by transmitting information from a predetermined number less than said plurality of voice circuits over the transmission path during any given frame, said system periodically sampling the amplitude of voice signals on each circuit of said plurality of voice circuits, comparing for each of said circuits a present amplitude sample with a prior amplitude sample which had been transmitted to the receiving station, and generating a transmission frame comprising a digital representation of those amplitude samples which differ from the corresponding prior amplitude samples by a predetermined amount, said transmission frame exhibiting an underflow when less than said predetermined number of samples are transmitted, a method of frame synchronization including the step of transmitting frame synchronization information in an unused time slot only during periods of underflow.

3,988,675

TRANSMIT-RECEIVE SWITCHING CIRCUIT WITH AUDIO MUTING

George Edward Dykas, Mundelein, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 10, 1975, Ser. No. 630,847
Int. Cl.² H04B *1/40*
U.S. Cl. 325—18 **10 Claims**



1. In a two-way communications apparatus having a transmitter, the transmitter having a power amplifier, a receiver, the receiver having an audio muting circuit, a channel selection means, a voltage supply circuit, a mode switch coupled to the voltage supply circuit, other radio circuits, and a switching and noise silencing circuit coupled to the mode switch and comprising:

a receiver switching circuit;

a transmitter switching circuit coupled to the receiver switching circuit for controlling the latter;

a first delay means having an input coupled to the output of the transmitter switching circuit,

a first gating means having a first input coupled to the output of the first delay means and adapted to enable the audio muting circuit;

a second delay means having an input coupled to the output of the receiver switching circuit;

a second gating means having a first input coupled to the output of the second delay means, the gating means adapted to enable the power amplifier; and

a monostable multivibrator having an input coupled to the channel selection means and the outputs of the monostable multivibrator being coupled to the second inputs of the first and second gating means.

3,988,676

CODING AND DECODING SYSTEM WITH MULTI-LEVEL FORMAT

Sang Y. Whang, Miami, Fla., assignor to Milgo Electronic Corporation, Miami, Fla.

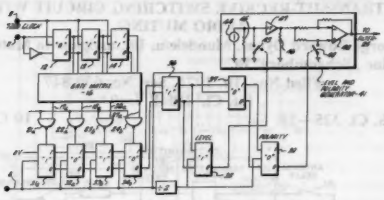
Continuation of Ser. No. 372,167, June 21, 1973, abandoned, which is a division of Ser. No. 143,762, May 17, 1971, Pat. No. 3,760,277. This application Feb. 20, 1975, Ser. No. 551,402
Int. Cl.² H03K *13/00*
U.S. Cl. 325—38 A **9 Claims**

1. A data transmission system wherein a random binary data stream is encoded for placement on a transmission line, said system comprising:

means for grouping every three bits of said binary data stream into a three bit word:

means for encoding said three-bit words by assigning two signal levels out of a set of three signal levels, each signal level having a duration of one encoding period, to each of said three-bit words, the relation between the signal levels in one three-bit word and the binary bits in that word being defined by a 3×3 matrix, said matrix repre-

senting three signal levels and nine unique groups of two of said three signal levels, a particular eight out of the possible nine unique two signal level groups being chosen to cause the first encoding period in every three-bit word to maintain an average energy level that is oppositely weighted from the average energy level of the second encoding period, thereby producing a plurality of encoded three-bit words, each word represented by two signal levels, a stream of such signal level groups exhibiting a cyclically varying signal characteristic having a frequency of ½T, where T is the time duration of one encoding period;



means for applying said stream of signal level groups to said transmission line;

means sampling the signal levels on the transmission line at a receiving end thereof, for generating a clock signal synchronized to the cyclically varying signal characteristic thereof.

3,988,677

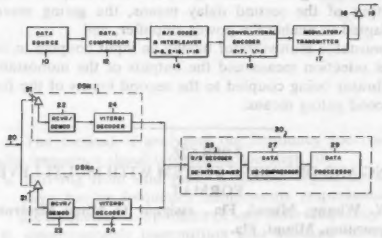
SPACE COMMUNICATION SYSTEM FOR COMPRESSED DATA WITH A CONCATENATED REED-SOLOMON-VITERBI CODING CHANNEL

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Robert F. Rice, South Pasadena, and Edward E. Hilbert, Tujunga, both of Calif.

Filed June 23, 1975, Ser. No. 589,173

Int. Cl.² H04L 1/10

U.S. Cl. 325—41 **10 Claims**



8. A method of communicating data from a spacecraft to a data processing center on Earth, the steps comprising:

gathering data in a spacecraft;

compressing the gathered data in said spacecraft;

coding the compressed data in said spacecraft in a concatenated Reed Solomon-Viterbi coding channel, comprising a Reed Solomon coder and interleaver followed by a Viterbi convolutional encoder;

transmitting to Earth the data coded by said concatenated Reed Solomon-Viterbi coding channel;

receiving on Earth the coded data transmitted from said spacecraft; and

decoding the received coded data, first by a Viterbi decoder followed by a Reed Solomon decoder and deinterleaver, the parameters E, J and I of the Reed Solomon portion of the coding channel and the parameters K and ν of the Viterbi portion of said channel being selected to provide a Reed Solomon codeword average error probability definable as P_{RS} being not greater than 10^{-4} with a system's signal-to-noise ratio, definable as E_b/N_o, being between 2 and 3db, J representing the number of bits per Reed Solomon symbol, E representing one-half the number of Reed Solomon parity symbols, I representing the number of interleaved Reed Solomon codewords, and where K represents the constraint length of the Viterbi encoder and $1/\nu$ is the code rate.

3,988,678

CIRCUIT ARRANGEMENT FOR THE MEASURING OF GROUP DELAY AND ATTENUATION DISTORTIONS

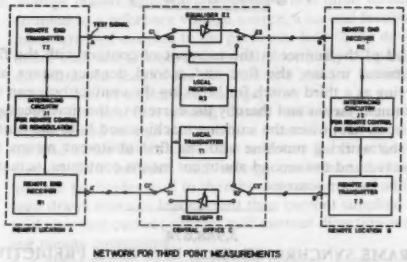
Stephen R. Hodge, Edinburgh, Scotland, assignor to Hewlett-Packard Limited, West Lothian, Scotland

Continuation of Ser. No. 551,878, Feb. 21, 1975, abandoned. This application Oct. 14, 1975, Ser. No. 622,297

Claims priority, application United Kingdom, June 3, 1974, 24573/74

Int. Cl.² H04B 1/00

U.S. Cl. 325—67 **15 Claims**



NETWORK FOR THIRD POINT MEASUREMENTS

1. A circuit arrangement for selectively measuring frequency dependent group delay of any of a plurality of transmission sections connected in a transmission loop, said circuit comprising:

a local receiver-transmitter set for location at a control station, said local receiver-transmitter set including:

a local transmitter; and

a local receiver;

a remote receiver-transmitter set for location at a remote station, said remote receiver-transmitter set including:

a remote transmitter;

a remote receiver; and

an interfacing circuit connected therebetween;

said plurality of transmission sections including:

a first transmission section between the local transmitter and the remote receiver; and

a second transmission section between the remote transmitter and the local receiver;

said local and remote transmitters each including carrier changeover frequency means for supplying in a periodically alternating sequence, a swept test carrier frequency signal and a preferably fixed reference carrier frequency signal, both carrier signals being amplitude modulated by the same modulating frequency;

said local transmitter further comprising slave control circuit means including a first manually operable mode switch having two positions for selectively modifying the output signal from the modulator means of the local transmitter to establish one of two different signal conditions in response to the manual setting of the first manually operable mode switch, said first manually operable mode switch is connected to said carrier changeover frequency means of the local transmitter for selecting one

of two modes of "slave control" operation, said two modes being "remote control" of the remote transmitter in the transmission path preceding the transmission section selected for testing and "remodulation" of the measurement signal of a selected transmission section obtained at the remote receiver onto a reference carrier signal for retransmission to any receiver later in the transmission path;

said local and remote receivers each including:

first circuit means for recovering modulation envelope signals;

second circuit means for deriving a measuring signal related to the group delay time or the phase shift between the two alternating envelope periods as an indication of the group delay of the selected transmission section under test; and

third circuit means for synchronizing the above two circuit means by various clock and timing signals; and

said interfacing circuit including:

a second manually operable mode switch connected to the remote transmitter for selecting one of the two remote receiver-transmitter set operation modes, said two modes being a "normal" operation mode and a "remote control"/"remodulating" mode;

an automatically operable mode switch connected to the second manually operable mode switch and responsive to a signal from the slave control circuit means of the local transmitter via the remote receiver to select between the "remote control" mode and the "remodulation" mode of operation for the remote transmitter when the second manually operable mode switch is in the "remote control"/"remodulation" mode; and

circuit means connected to the remote receiver and connectable to the remote transmitter for inputting carrier and modulation signals to the remote transmitter, said remote transmitter being connectable to said circuit means via both the second manually operable mode switch and the automatically operable mode switch.

3,988,679

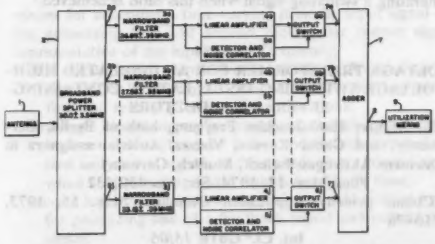
WIDEBAND RECEIVING SYSTEM INCLUDING MULTICHANNEL FILTER FOR ELIMINATING NARROWBAND INTERFERENCE

James McMillen Clarke, Whitesboro; Charles E. Hearty, Marcy, and John A. Rougas, Liverpool, all of N.Y., assignors to General Electric Company, Utica, N.Y.

Continuation-in-part of Ser. No. 357,160, May 4, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,499

Int. Cl.² H04B *1/10*

U.S. Cl. 325—377 **2 Claims**



2. A receiving system for eliminating narrowband interference from a wideband signal coupled between an input means and utilization means comprising, in combination:

a plurality of bandpass filters coupled to said input means, each of said filters having a passband comprising a different portion of the bandwidth of said wideband signal;

an amplifier connected to the output of each of said bandpass filters;

interference detection means coupled to the outputs of said bandpass filters, said interference detection means being responsive to a narrowband signal passed by one of said filters and providing a predetermined output indicative thereof;

coupling means for coupling the signals passed by said amplifiers to the utilization means to present a wideband signal thereto; and

switch means connected between the outputs of said amplifiers and said coupling means, said switch means being controlled by said interference detection means such that said predetermined output from the latter operates to cause said switch means to substantially attenuate the signal passed by the amplifier connected to the bandpass filter passing a narrowband signal, whereby narrowband distortion is substantially eliminated from said wideband signal as presented to said utilization means.

3,988,680

REMOTE TELEVISION CONTROL

Eric A. Kolm, c/o Signal Science, Inc., 140 Lowland St., Hollis-ton, Mass. 01746

Continuation-in-part of Ser. No. 476,438, June 5, 1974, abandoned, which is a continuation-in-part of Ser. No. 359,315, May 11, 1973, abandoned. This application Apr. 11, 1975, Ser. No. 567,410

Int. Cl.² H03J *1/22*; G05G *1/10*; F16C *1/16*

U.S. Cl. 325—392 **17 Claims**

1. An external remote control attachment for a TV set of the type having a case and a rotary tuner shaft with an end accessible through the case, said attachment comprising

A. torque-applying means adapted to be connected to the accessible end of the tuner shaft,

B. a housing spaced appreciably from the tuner shaft,

C. actuatable moving means supported inside the housing,

D. first force-transmitting means mechanically connected between the moving means and the torque-applying means so that when the moving means is actuated, it moves said first means and thereby the torque-applying means so that the latter steps the tuner toward an adjacent channel position,

E. second force-transmitting means connected to the housing and extending substantially to the TV set for applying a reactive force to the TV set which is substantially equal and opposite to a force applied by the moving means to the torque-applying means so that there is substantially no net force applied between the housing and the TV set when the moving means is actuated, and

F. means responsive to remote energy signals for actuating the moving means.

3,988,681

AUTOMATIC TUNING SYSTEM

Joe H. Schürmann, Oberhummel, Germany, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 4, 1975, Ser. No. 601,784

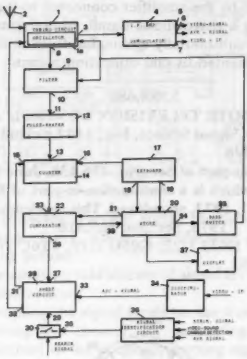
Claims priority, application Germany, Aug. 7, 1974, 2437974

Int. Cl.² H04B *1/32*

U.S. Cl. 325—470 **13 Claims**

1. A broadcast receiver channel search and selection system comprising heterodyne oscillator means for generating a sig-

nal the frequency of which may be swept over a range in which predetermined frequency values are associated with predetermined receiver channels, multiresonance filter means for receiving as input signal the signal from the heterodyne oscillator and adapted in response to an input signal frequency value corresponding to a receiver channel generate an output signal, counter means for counting output signals from the multiresonance filter means, an input device for introducing and storing a number associated with selected receiver channel, a comparator circuit connected to said counter and said input device for comparing the count with the number stored in the input device and for producing signals indicating the the coincidence or noncoincidence of said count and said stored number, and a sweep device operable to vary the frequency of said heterodyne oscillator responsive to a noncoincidence indicating signal from the comparator circuit, and operable to discontinue variation of the frequency of said heterodyne oscillator in response to a coincidence indicating signal from said comparator circuit.



3,988,682

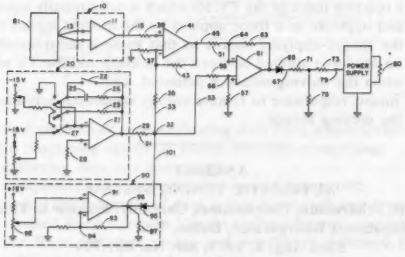
VOLTAGE RAMP TEMPERATURE CONTROLLER

Paul Mikonis, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 23, 1975, Ser. No. 589,160

Int. Cl.² G01K 7/00; H05B 1/02

U.S. Cl. 328—3 **8 Claims**



1. An electronic circuit providing an output control signal that is in direct relation to an input signal, comprising:

an input signal having a rate of change;

means for generating a sweep voltage signal which varies in a predetermined fashion between a first preselected voltage and a second preselected voltage over a preselected time period;

first summing means having said sweep voltage signal and said input signal operatively coupled thereto for summing said sweep voltage and input signals to provide an error signal output, said error signal having an amplitude directly related to any deviation between said input and sweep voltage signals;

second summing means having said error signal output and said sweep voltage signal operatively coupled thereto for summing said error and sweep voltage signals to provide a control signal output operative to control the rate of change of said input signal.

3,988,683

METHOD AND APPARATUS FOR GENERATING A SWITCHING SIGNAL USING ODD AND EVEN HARMONICS AND COMPARISON OF RECTIFIED HARMONICS TO RATIO POTENTIAL

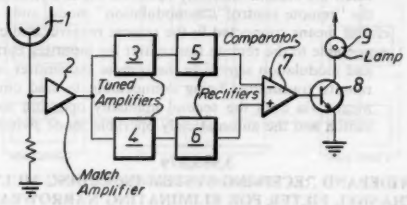
Rudolf Böhme, Wetzlar; Klaus Heinecke, Braunfels, and Fromund Hock, Wetzlar, all of Germany, assignors to Ernst Leitz G.m.b.H., Germany

Continuation-in-part of Ser. No. 418,270, Nov. 23, 1973, abandoned. This application Mar. 4, 1975, Ser. No. 555,248

Claims priority, application Germany, Nov. 27, 1972, 2258025

Int. Cl.² H03K 1/00; H03D 13/00; H03K 5/20

U.S. Cl. 328—61 **4 Claims**



1. A method for generating switching signals from an alternating current containing a harmonic or from a plurality of alternating currents each containing harmonics with adjacent fundamentals, comprising filtering at least one even and one odd harmonic from the frequency range, individually amplifying each harmonic, separately rectifying each amplified harmonic, commonly comparing said rectified harmonics in a single comparator adjusted to a given ratio potential and generating a switching signal when this ratio is achieved.

3,988,684

VOLTAGE TRANSFORMER FOR AN INSULATED HIGH-VOLTAGE SWITCHING INSTALLATION CONTAINING SEVERAL CONDUCTORS

Willi Müller; Hans-Joachim Freygang, both of Berlin, Germany, and Gabor Kovacs, Vienna, Austria, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 12, 1974, Ser. No. 450,432

Claims priority, application Germany, Mar. 15, 1973, 2313478

Int. Cl.² G01R 15/06

U.S. Cl. 323—93 **8 Claims**

1. A voltage transformer for a fully insulated high-voltage installation containing several conductors comprising: a plurality of electrodes corresponding to respective ones of the conductors, said electrodes being disposed outside of the arrangement of the conductors in such a manner that each one of said electrodes is disposed adjacent a corresponding one of the conductors, each of said electrodes and the conductor adjacent thereto conjointly defining a high-voltage capacitor; a plurality of low-voltage capacitors disposed outside of the

region occupied by said electrodes, said low-voltage capacitors being connected to corresponding ones of said electrodes so as to cause corresponding ones of said high-voltage capacitors and said low-voltage capacitors to conjointly define respective capacitive voltage dividers; a plurality of summing

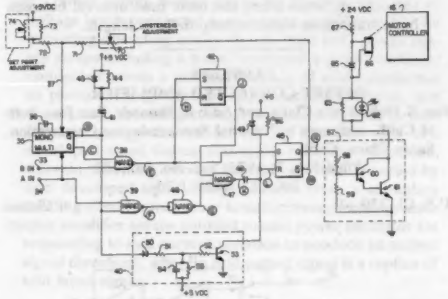
amplifiers corresponding to respective ones of said electrodes, each of said summing amplifiers having an input for connecting the corresponding electrode thereto, the outputs of each one of said summing amplifiers being connected, respectively, to the inputs of the remaining ones of said summing amplifiers.

3,988,685

ELECTRONIC FREQUENCY SENSOR

Ronald Wayne Hughes, Madison, Ohio, assignor to Harvey Hubbell Incorporated, Bridgeport, Conn.

Filed Mar. 4, 1975, Ser. No. 555,162
Int. Cl.² H03K *1/18*
U.S. Cl. 328—141 **8 Claims**



1. A digital frequency responsive apparatus comprising means for accepting a time-varying periodic input signal and for generating first and second rectangular output signals representative of the input signal frequency;

first circuit means responsive to one of said first and second signals for producing rectangular pulses having one of first and second predetermined durations;

first logic circuit means for comparing the time relationship between said rectangular pulses and the other one of said first and second signals and for producing a control signal when said pulses and said signals overlap in time;

second logic circuit means responsive to said control signal for producing one of a feedback signal and an actuating signal;

said first circuit means being responsive to said feedback signal to produce rectangular pulses having the other one of said first and second predetermined durations;

third logic circuit means for comparing the time relationship between said one of said first and second signals and the inverse of said rectangular pulses and for producing a reset signal,

said second logic circuit means being responsive to said reset signal to terminate production of said one of said feedback and actuating signals; and

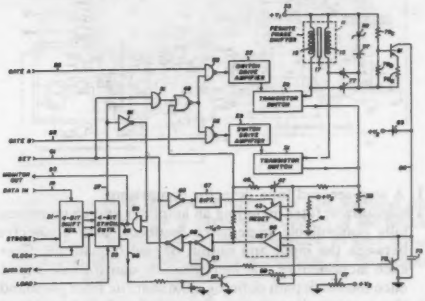
means for responding to said actuating signal to actuate a utilization device.

3,988,686

DIGITALLY CONTROLLED ANALOG FLUX SENSING FERRITE PHASE SHIFTER DRIVER

Donald L. Beall, North Syracuse; Lee A. Talbot, Brewerton, and Theodore N. Thompson, North Syracuse, all of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,635
Int. Cl.² H03B *3/04*
U.S. Cl. 328—155 **5 Claims**



1. A digitally controlled phase shift network comprising:

a. an analog phase shifter having a magnetizable core exhibiting plural magnetic states and differential phase shift varying correspondingly with the integral of an applied magnetic flux drive;

b. magnetization current supply means for said phase shifter including a magnetizing current source and switch means operable to control flow of magnetizing current from said source to said phase shifter;

c. digital counter means connected to receive a digital input signal for entry of an initial count therein, said counter means being operative upon application of each count input pulse to effect a unit change in a running count therein and operative upon said running count reaching a magnitude determined by said initial count to generate an output pulse;

d. input means for generating a digital input signal representing a called-for value of phase shifter differential phase shift and applying such signal to said digital counter means for entry therein as said initial count;

e. voltage responsive means connected to said phase shifter for response to an operating voltage having predetermined relationship to phase shifter magnetic flux, said voltage responsive means including means for integrating such voltage with respect to time to thereby provide a volt-time integral indicative of the differential phase shift effectuated by said magnetizing current;

f. control means connected to said volt-time integration means and operative to zero the volt-time integral each time it reaches a predetermined value representative of a differential phase shift increment of predetermined unit magnitude, and operative simultaneously to apply a phase shift increment count pulse input to said digital counter means thereby to effect a unit change in the running count in said counter; and

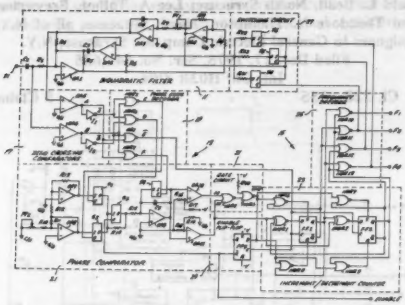
g. means responsive to said digital counter output pulse to open said switch means to thereby cut off current flow to said phase shifter when the running count in said digital counter reaches said predetermined magnitude indicating that the called-for value of differential phase shift has been achieved.

3,988,687

STEP-SERVOED TONE DETECTOR

Daniel Richard Asmussen, Kirkland, Wash., assignor to Tel-Tone Corporation, Kirkland, Wash.

Filed July 18, 1975, Ser. No. 597,309
Int. Cl.[2] H04B *15/00*; H03K *9/06*
U.S. Cl. 328—167 14 Claims



1. A step-servoed tone detector comprising:

a bi-quadratic filter including an amplifier and an incrementally controllable impedance feedback path connected between the input and output of said biquadratic filter, each increment of said incrementally controllable impedance feedback path defining a biquadratic filter passband;

a phase comparison system connected to said biquadratic filter so as to receive two signals, one of said two signals being an input signal applied to said biquadratic filter and the other of said two signals being the feedback signal of said biquadratic filter created by said applied signal, said phase comparison system comparing said two signals and generating an output indicative of the frequency relationship between said input signal and the passband of the biquadratic filter; and,

a control system connected to said phase comparison system for receiving said output indicative of the frequency relationship between said two signals and connected to said biquadratic filter so as to control the impedance of the incrementally controllable impedance feedback path of said biquadratic filter, said control incrementally varying the impedance of said incrementally controllable impedance feedback path such that the center frequency of said biquadratic filter is incrementally moved toward the frequency of said signal applied to said biquadratic filter.

3,988,688

DEMODULATOR FOR BINARY-PHASE MODULATED SIGNALS HAVING A VARIABLE CLOCK RATE

Tu Tzu Wu, Pasadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

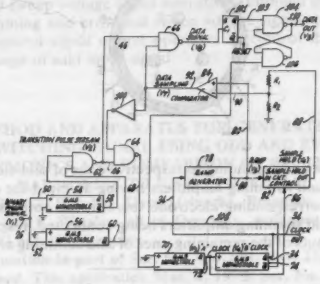
Filed Feb. 28, 1975, Ser. No. 554,064
Int. Cl.[2] H03K *9/04*
U.S. Cl. 329—107 6 Claims

1. A demodulator for binary-phase modulated signals having a variable clock rate, the signals including basic transitions between two possible signal states spaced at basic time intervals of approximately equal length, and intermediate transitions between selected adjacent ones of the basic transitions, to represent binary digits of coded data, said demodulator comprising:

sensing means for sensing transitions of said modulated signals in either direction between the two possible signal states;

clock means connected to said sensing means for generating control clock pulses corresponding in time to the occurrence of the basic transitions in said modulated signals; and

data detection means connected to said sensing means for detecting intermediate transitions occurring between control clock pulses, said intermediate transitions being indicative of one logic state and the lack of said intermediate transitions being indicative of a second logic state, said data detection means including timing means for measuring the times between successive basic transitions, and circuit means coupled with said timing means, for



enabling detection of said intermediate transitions immediately after each basic transition and inhibiting detection of said intermediate transition after a predetermined percentage of the time interval between the two immediately preceding basic transitions;

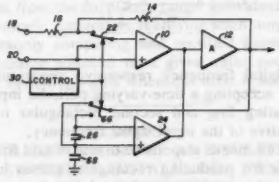
whereby said clock means and said data detection means operate to detect basic and intermediate transitions, respectively, even when the basic time interval between basic transitions varies substantially in length.

3,988,689

OFFSET CORRECTED AMPLIFIER

Sam S. Ochi, Santa Clara, and Adib R. Hamade, San Jose, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 7, 1975, Ser. No. 548,082
Int. Cl.[2] H03F *1/26*
U.S. Cl. 330—9 6 Claims



4. A circuit for cancelling the offset voltage of a signal amplifier, comprising:

a. a second amplifier,

b. a third amplifier connected to the output of said signal amplifier and to the output of said second amplifier,

c. storage means connected to one input of said second amplifier for storing the output of said third amplifier,

d. control means for connecting the inputs of said signal amplifier together and for connecting the output of said third amplifier to said storage means during a first time period and for disconnecting the inputs of said signal amplifier from one another and for disconnecting the output of said third amplifier from said storage means during a second time period, and

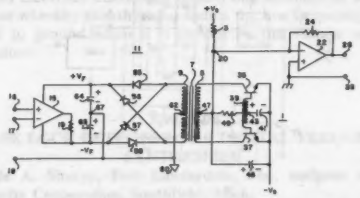
second storage means connected to another input of said second amplifier for storing during said first and second time periods the output of said third amplifier which is generated

during a third time period which precedes said first time period, and wherein said control means is disposed for disconnecting the inputs of said signal amplifier from one another during said third time period.

3,988,690
AMPLIFIER CIRCUIT HAVING A FLOATING INPUT STAGE

Gary Charles Vance, Portland, and Richard James Ballard, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 4, 1973, Ser. No. 403,367
Int. Cl.² H03F 3/38
U.S. Cl. 330—10 **5 Claims**



3. An amplifier circuit including a floating input stage, comprising:

input amplifier means including a load resistor across which an input signal is developed, said input amplifier means electrically isolated from circuit ground;

D.C. power supply means producing floating D.C. output voltage levels connected to said input amplifier means for providing operating power thereto, said D.C. power supply means including a transformer and a power oscillator connected across a primary winding of said transformer to provide energy for said input amplifier means, said transformer providing a single transmission path to couple said energy thereacross in one direction and said developed signal thereacross in the opposition direction, wherein operating current for said oscillator is varied by said developed signal being reflected from a secondary winding of said transformer to said primary winding; and

output amplifier means coupled to said power oscillator for responding to said current variation to produce an output signal therefrom, wherein said output signal is a replica of said input signal.

3,988,691
POWER AMPLIFIER

Kelvin Shih, Detroit, Mich., assignor to Kelvin Shih, Troy, Ohio

Filed Apr. 16, 1975, Ser. No. 568,731
Int. Cl.² H03F 3/26
U.S. Cl. 330—15 **3 Claims**

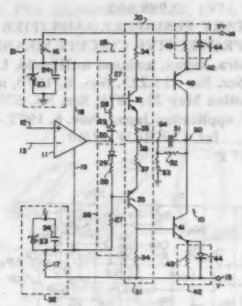
1. In an amplifier circuit including a conventional operational amplifier and a pair of conventional voltage regulators for providing positive and negative supply voltage to the operational amplifier, the improvement of a complementary circuit for providing low distortion high power class A-B amplification comprising:

a pair of voltage dividers, each voltage divider coupled between the output of one voltage regulator and the output of the operational amplifier;

a pair of divider circuits, each responsive to one of said voltage divider networks, each driver circuit operating in the constant current mode and having current flow responsive to changes in the output of the operational amplifier; said pair of driver circuits being connected together at a first terminal;

a pair of power transistors, each coupled to one of said driver circuits; each power transistor operating to prevent junction breakdown and for amplifying the output of its driver circuit;

said pair of power transistors having their collectors tied together at a second terminal and providing the circuit output at said second terminal; and

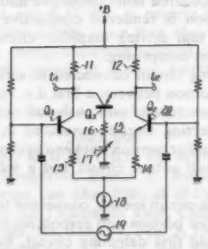


a feedback circuit coupled between said first terminal and said second terminal to prevent oscillation of the circuit output and to provide negative feedback to said driver circuits, thereby providing faster response to the output of said operational amplifier.

3,988,692
GAIN CONTROL CIRCUITS

Yoshio Ishigaki, Tokyo, and Takashi Okada, Yamato, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 25, 1975, Ser. No. 571,686
Claims priority, application Japan, May 31, 1974, 49-61532
Int. Cl.² H03G 3/30
U.S. Cl. 330—29 **8 Claims**



1. A gain control circuit comprising:

a bidirectional transistor having first, second and third terminals,

first and second impedance elements coupled in said circuit,

means for applying a time varying signal having a first polarity to said first terminal,

said time varying signal being coupled through said first impedance element,

means for applying a time varying signal of a second opposing polarity to said third terminal,

said opposing time varying signal being coupled through said second impedance element,

means for applying a controllable bias to said second terminal for placing said bidirectional transistor in a controllable state of conduction,

said controllable bias being linearly variable with respect to a manually adjustable gain adjustment means,

said bidirectional transistor being responsive to gain control operation by the use of both positive and negative values

of said controllable bias with respect to a threshold bias value, and

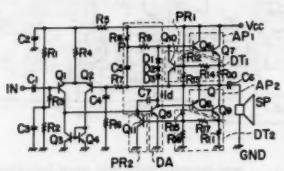
output means coupled to one of said first and third terminals for deriving a gain controlled signal therefrom.

3,988,693

COMPLEMENTARY PUSH-PULL AMPLIFIER DEVICE WITH PROTECTIVE CIRCUIT MEANS

Kunio Seki, Kodaira, Japan, assignor to Hitachi, Ltd., Japan

Continuation of Ser. No. 413,223, Nov. 6, 1973, abandoned.
This application May 21, 1975, Ser. No. 579,592
Claims priority, application Japan, Nov. 6, 1972, 47-110303
Int. Cl.² H03F *21/00*
U.S. Cl. 330—207 P **11 Claims**



1. In a complementary push-pull amplifier device with protective circuit means including at least a driving amplifier circuit and a push-pull output circuit connected to the output of said driving amplifier circuit, the push-pull output circuit consisting of a first amplifier portion and a second amplifier portion, wherein inputs of said first and second amplifier portions are respectively connected to the output of said driving amplifier circuit,

so that said first amplifier portion is rendered conductive and said second amplifier portion is rendered non-conductive respectively when the drive current of said driving amplifier circuit decreases, and said first amplifier portion is rendered non-conductive and said second amplifier portion is rendered conductive when the drive current of said driving amplifier circuit increases, the improvement comprising:

a first detecting circuit connected in series with said first amplifier portion between a first d.c. voltage source and an output juncture of said push-pull output circuit;

a second detecting circuit connected in series with said second amplifier portion between said output juncture of said push-pull output circuit and a second d.c. voltage source;

first protective circuit means, connected to the input of said first amplifier portion and responsive to a first detected signal of said first detecting circuit, for controlling the input of said first amplifier portion, when said first amplifier portion falls out of its allowable operating range; and

second protective circuit means, connected to the input of said driving amplifier circuit and responsive to a second detected signal of said second detecting circuit, for controlling the input of said second amplifier portion when said second amplifier portion falls out of its allowable operating range.

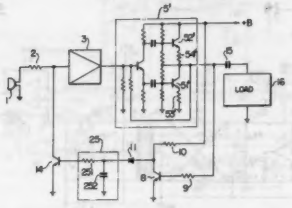
3,988,694

AUTOMATIC LEVEL CONTROLLER

Seishi Yamazaki, Mito, Japan, assignor to Hitachi, Ltd., Japan

Filed Dec. 10, 1975, Ser. No. 639,587
Claims priority, application Japan, Dec. 20, 1974, 49-145588
Int. Cl.² H03G *3/30*
U.S. Cl. 330—29 **8 Claims**

1. An automatic level controller comprising: an audio terminal; an audio output terminal; a power source; an audio amplifying circuit connected between said audio input and output terminals for amplifying an audio signal applied to said audio input terminal and applying an amplified audio output signal to said audio output terminal; an audio level control circuit connected to the input terminal and adapted to be turned on and off by an audio level control signal applied thereto for controlling the audio level of the audio input signal applied to said audio amplifying circuit by bypassing to the ground a portion of said audio input signal; a switching circuit connected to said power source and operatively supplied with the output signal of said audio amplifying circuit and adapted to be turned on and off depending on whether or not the level of the audio output signal of said audio amplifying circuit exceeds a predetermined level, said switching circuit delivering one of two constant outputs having different potential levels from each other depending on the on state and off state; and a time constant circuit for setting the attack period and release period of control by said audio level control circuit in response to the application of the constant potential output from said switching circuit, wherein one of said constant potential outputs of said switching circuit applied through said time constant circuit to said audio level control circuit is so selected to cause said audio level control circuit to be turned on when the level of said audio output signal of said audio amplifying circuit exceeds said predetermined level.

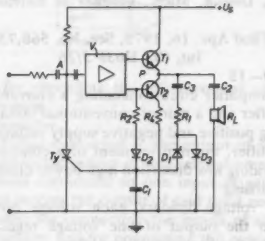


3,988,695

PROTECTION CIRCUIT FOR OUTPUT STAGE OF LOW FREQUENCY AMPLIFIERS

Johann Mattfeld, Heilbronn, and Alfons Schmitt, Talheim, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Mar. 17, 1975, Ser. No. 559,020
Claims priority, application Germany, Mar. 30, 1974, 2415628
Int. Cl.² H03F *21/00*
U.S. Cl. 330—207 P **2 Claims**



1. An electronic cut-out for the protection of the output transistors of the output stage of a low frequency amplifier comprising, in combination: first means for producing a first direct voltage proportional to the alternating output voltage of the amplifier, said first means including a first resistor connected to the output of the amplifier and a first diode connected in series with said first resistor; second means for

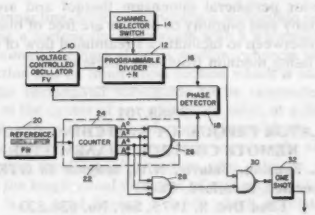
producing a second direct voltage proportional to the collector alternating current of the output stage transistors and of opposite polarity to said first direct voltage, said second means including a second resistor connected to the base of one of said output stage transistors and a second diode connected in series with said second resistor; means for comparing said first and second direct voltages including a capacitor having one terminal connected to each of said first and second diodes and its other terminal connected to ground; and means responsive to the voltage on said capacitor for shunting the low frequency input signal to said output stage of said amplifier to ground when said second direct voltage increases beyond a permissible threshold value, said means for shunting including a normally non-conducting thyristor connected between a signal input line to said output stage and ground, and having its control electrode connected to said one terminal of said capacitor whereby said thyristor shunts the low frequency input signal to ground when it is ignited by the voltage on said capacitor.

3,988,696

PHASE LOCK DETECTOR FOR DIGITAL FREQUENCY SYNTHESIZER

Claude A. Sharpe, Fort Lauderdale, Fla., assignor to The Bendix Corporation, Southfield, Mich.

Filed Nov. 28, 1975, Ser. No. 636,349
Int. Cl.² H03B *3/04*
U.S. Cl. 331—1 A **1 Claim**



1. In a digital frequency synthesizer including a voltage controlled oscillator, first frequency dividing means for dividing the frequency of signal from said voltage controlled oscillator by a factor N; a reference oscillator, second frequency dividing means for dividing the frequency of signal from said reference oscillator by a factor M; and means for comparing the phase of outputs from said first and second frequency dividing means and providing control voltage for said voltage cpntrolled oscillator related to the phase difference between said dividing means outputs, a phase lock detector, comprising:

first logic means providing an output which changes state periodically for an interval which begins after the appearance of M-K cycles of signal from said reference oscillator, K being a predetermined integer, and continues at least until the appearance of M cycles of signal from said reference oscillator;

second logic means for determining the time coincidence of signal from said first frequency dividing means with said change of state interval of said first logic means; and

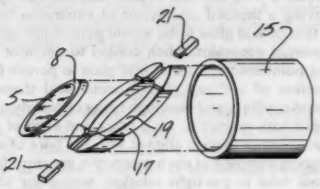
means controlled by second logic means for producing an out-of-lock signal whenever signal from said first frequency dividing means fails to appear during said interval of said first logic means.

3,988,697

GLASS LASER DISCS WITH ANNULAR ALKALI LEAD BORATE COATINGS AND USES THEREOF

Richard F. Cooley, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 332,057, Feb. 13, 1973, Pat. No. 3,882,415. This application Oct. 15, 1974, Ser. No. 512,792
Int. Cl.² H01S *3/17, 3/093*
U.S. Cl. 331—94.5 E **12 Claims**



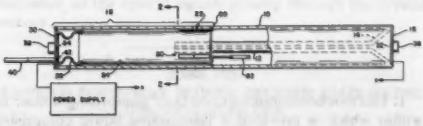
1. A laser assembly comprising means for providing a source of pumping light; means defining an optical resonant cavity for the lasing material including a housing; means for holding a glass laser disc in the housing; and a glass laser disc capable of excitation into a metastable high energy state and stimulated emission of electromagnetic radiation therefrom, the glass laser disc located within the housing and positioned along the optical axis of the laser, the disc having an annular lead borate glass coating capable of absorbing energy at a wave length of about 1.06 microns to thereby absorb any parasitic oscillations, the glass coating having an index of refraction of about 3 to 12% greater than the index of refraction of the laser disc, the disc and coating being so constructed and arranged that the thermal expansion and contraction of the coating are sufficiently matched with the glass laser disc so that the development of undesirable strains in the disc is prevented, the glass coating comprising a mixture of alkali metal oxides in which at least two different alkali metal oxides are present, and any K_2O that is present is limited to an amount of not substantially more than about 1% by weight, and an effective energy-absorbing amount of a heavy metal oxide that absorbs energy at a wave length of about 1.06 microns.

3,988,698

PLASMA TUBE AND METHOD OF MANUFACTURE

Dale E. Crane, Sunnyvale; Robert E. Jones, San Jose, and Hector A. Meneses, Los Altos Hills, all of Calif., assignors to Spectra-Physics, Inc., Mountain View, Calif.

Continuation of Ser. No. 548,034, Feb. 7, 1975, abandoned. This application Feb. 18, 1976, Ser. No. 659,083
Int. Cl.² H01S *3/03*
U.S. Cl. 331—94.5 D **12 Claims**



1. In a plasma tube structure for use in gas lasers of a type including an outer glass envelope within which is disposed a glass capillary having a discharge path defining bore therethrough by the application of an electric current from a suitable power supply, the improvement comprising a conductive metal anode disc having a lateral extent comparable to that of said envelope, said disc and said envelope being fused together at one end of said envelope, a radially extending flange

member interconnecting and fused between said capillary and said envelope to support said capillary such that said flange closes all discharge paths between said one end and the remote end of said capillary except through said bore, said capillary, envelope, and flange member being made of a glass having a predetermined coefficient of expansion, a cathode assembly disposed in communication with that side of said envelope away from said anode and beyond said flange, a cathode conductive disc having a lateral extent comparable to that of said envelope, said disc being fused to said envelope at the end remote from said anode disc, said discs being made of metal having a thermal coefficient of expansion sufficiently close to that of said glass to be within permissible stress limits for differential expansion when cooled to ambient from the annealing point temperature of said glass to permit formation and retention of a direct glass-to-metal seal therebetween, each of said capillary and envelope being circularly cylindrical and coaxial with respect to each other and each of said discs having an aperture therein aligned with the bore of said capillary members disposed at each respective aperture for closing the plasma tube in gas-tight relation, means for forming an optical cavity within said plasma tube and through the capillary bore thereof, said power supply delivering a discharge forming electric field across said anode disc and said cathode disc, and means forming a conductive connection between said cathode assembly and said cathode disc.

3,988,699

ELECTROCHEMILUMINESCENCE LASER

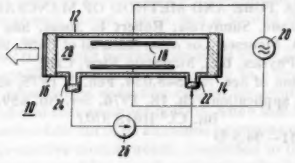
Klaas Zachariasse, Gottingen, Germany, assignor to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed May 30, 1975, Ser. No. 582,238

Claims priority, application Germany, May 31, 1974, 2426367

Int. Cl.[2] H01S 3/20

U.S. Cl. 331—94.5 L 5 Claims



1. Electrochemiluminescence laser comprising a laser tube within which is provided a laser-active liquid comprising a solvent and at least one dissolved excimer-forming aromatic hydrocarbon material and further comprising electrodes in contact with said liquid in said laser tube and connected to a voltage source, the nature of said dissolved material and the output of said voltage source being such as to generate exciplexes containing a plurality of co-excimerized organic radicals by passage of current through said laser-active liquid, which exciplexes are capable of transitions into a state of lower energy upon stimulated emission of radiation.

3,988,700

GAS-DYNAMIC MOLECULAR LASER

Gunthard Born, Munich, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

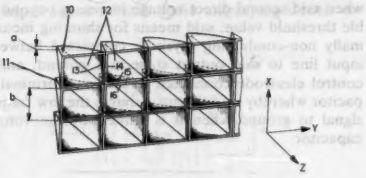
Continuation of Ser. No. 363,522, May 24, 1973, abandoned.

This application July 14, 1975, Ser. No. 595,862

Claims priority, application Germany, May 31, 1972, 2226392

Int. Cl.[2] H01S 3/22, 3/095

U.S. Cl. 331—94.5 P 8 Claims



1. In a gas-dynamic laser utilizing a supersonic flowing gaseous lasing medium, the improvement comprising:

a plurality of contoured nozzles having interior surfaces expanding in three directions and having a polygon-shaped cross section arranged side-by-side and the axes thereof extend in a parallel relation, each of said nozzles having a polygon-shaped nozzle throat and a polygon-shaped nozzle outlet wherein each of the individual sides of each of said polygon-shaped nozzle outlets are straight, the area of said nozzle throat being smaller than the area of said nozzle outlet, the mutually adjacent straight sides at said nozzle outlets contacting each other over the full exterior peripheral dimension thereof and are parallel whereby said plurality of nozzles are free of blank spaces therebetween to facilitate a streamlined flow of said gaseous lasing medium from said nozzle outlets.

3,988,701

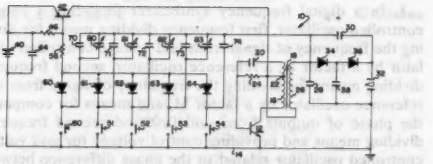
OSCILLATOR FREQUENCY SWITCHING CIRCUIT FOR REMOTE CONTROL TRANSMITTER

David L. Funston, Batavia, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 8, 1975, Ser. No. 638,533

Int. Cl.[2] H03B 5/12; H03J 5/32; H04B 11/00

U.S. Cl. 331—179 8 Claims



1. A remote control transmitter comprising:

an oscillator for providing a plurality of signals each having a corresponding discrete frequency;

a battery having a first terminal connected by a common conductor to said oscillator;

a semiconductor switch having an input terminal connected to a second terminal of said battery and an output terminal connected to said oscillator;

a plurality of single-pole, single-throw switches each having a first contact connected to said common conductor;

means connecting a second contact of each of said plurality of switches to said semiconductor switch for closing said semiconductor switch when one of said plurality of switches is closed; and

a plurality of frequency determining means each connected to said oscillator and to a respective one of said second contacts for causing said oscillator to provide one of said plurality of signals when the corresponding one of said plurality of switches is closed.

3,988,702

WAVEGUIDE SECTION FOR CONNECTING RECTANGULAR WAVEGUIDE WITH ELLIPTICAL WAVEGUIDE

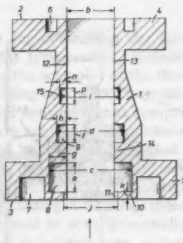
Ernst Kaffenberger, Backnang, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed June 2, 1975, Ser. No. 582,923

Claims priority, application Germany, June 1, 1974, 2426699; Aug. 10, 1974, 2438504

Int. Cl.² H01P *5/08*

U.S. Cl. 333—33 **16 Claims**



1. A connecting device comprising a waveguide section for connecting a rectangular waveguide with a waveguide having an approximately elliptical cross section, wherein said waveguide section has an inner cross section which is identical to that of the rectangular waveguide to be connected and is provided at the center of one of its wide sides, at a distance of about $\frac{1}{8} \lambda_g$ from the plane of connection with the elliptical waveguide, where λ_g is the waveguide wavelength, with a first recess having the form of a portion of a cylinder, having a length, in the longitudinal direction of said waveguide section, less than $\frac{1}{4} \lambda_g$, and having a depth which is related to its length in a manner such that the two waveguides to be connected will be matched over a broad band.

3,988,703

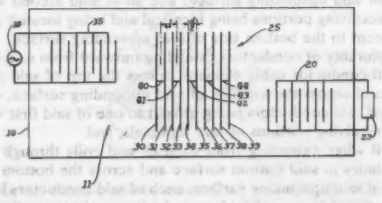
ACOUSTIC SURFACE WAVE DEVICE HAVING SPLIT-ISOLATED OR SPLIT-CONNECTED MULTISTRIP COUPLER

Adrian J. DeVries, Elmhurst, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Dec. 31, 1975, Ser. No. 645,488

Int. Cl.² H03H *9/26, 9/04, 9/32;* **H01L** *41/10*

U.S. Cl. 333—72 **19 Claims**



1. An acoustic surface wave device comprising:

a piezoelectric substrate defining a wave propagating surface;

transmitting transducer means formed on said surface for launching acoustic surface waves, said launched waves being resolvable into symmetrical and anti-symmetrical mode components;

receiving transducer means formed on said surface converting a substantial portion of the acoustic energy of impinging acoustic surface waves into electrical energy; and

coupling means located in the surface wave propagation path between said transducer means substantially attenuating one of said mode components for surface waves having acoustic wavelengths within a predetermined range while coupling the other of said mode components substantially unattenuated.

3,988,704

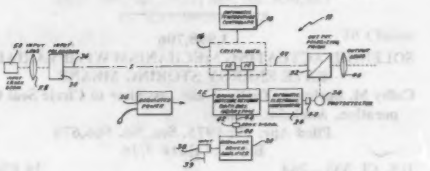
BROADBAND ELECTROOPTICAL MODULATOR

Robert R. Rice, St. Louis County; Victor H. Nettle, St. Louis; Louis B. Allen, and Samuel I. Green, both of St. Louis County, all of Mo., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Apr. 26, 1974, Ser. No. 464,497

Int. Cl.² H01S *3/10*

U.S. Cl. 332—7.51 **22 Claims**



1. An optical modulator system comprising electrooptic modulator means including a pair of crystal members each having mutually perpendicular x, y and z optical axes, means mounting said crystal members in optical alignment with their z-axes oriented to be perpendicular relative to each other and relative to the crystal alignment, means to establish a controlled relatively non-temperature varying environment surrounding said crystal members, means directing optical input signals from a signal source at said aligned crystal members normal to the z-axes thereof whereby the input signals pass through the crystal members and exit therefrom, and means for modulating the optical signals as they pass through the crystal members by predeterminately controlling the optical polarization of the exiting signals, said modulator means including a source of electrical modulation signals, and means for applying said modulation signals to the crystal members, said last named means including a matching circuit network having relatively broadband characteristics connected between the modulation signal source and the means for applying the modulation signals to the crystal members, the modulation signals are applied to the crystals having an effect on the polarization of the optical signals passing through the crystal members.

3,988,705

BALANCED FOUR-WAY POWER DIVIDER EMPLOYING 3DB, 90° COUPLERS

Michael J. Drapac, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 20, 1975, Ser. No. 633,774

Int. Cl.² H01P *5/18*

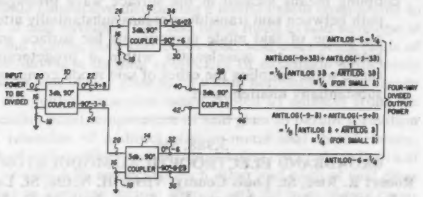
U.S. Cl. 333—10 **3 Claims**

1. A four-way power divider employing 3db, 90° couplers, comprising:

a first coupler, having one input connected for receiving the signal whose power is to be divided and the other input connected to a terminatng impedance;

a second coupler, having one input connected to the 0° degree output of said first coupler and the other input connected to a terminating impedance;

a third coupler, having one input connected to the −90° degree output of said first coupler and the other input connected to a terminating impedance, and



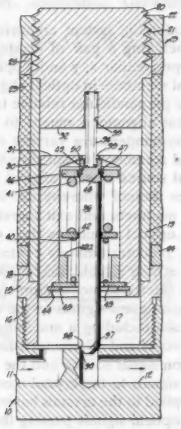
a fourth coupler, having one input connected to the 0° degree output of said second coupler and the other input connected to the −90 ° degree output of said third coupler, with its two outputs and the −90° and 0° outputs of said second and third couplers, respectively, providing the four-way divided output power.

3,988,706

SOLENOID ACTUATING MECHANISM WITH VARIABLE RATE ENERGY STORING MEANS

Colby M. Springer, Tustin, Calif., assignor to Circle Seal Corporation, Anaheim, Calif.

Filed Apr. 10, 1975, Ser. No. 566,670
Int. Cl.² H01F 7/16
U.S. Cl. 335—264 **16 Claims**



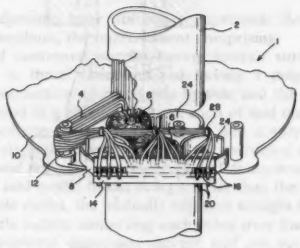
1. Solenoid actuating mechanism operable to move movably supported means against a relatively high resisting force, said mechanism including movably supported means movable between first and second positions and normally biased to said first position so long as the solenoid mechanism is de-energized, solenoid armature means embraced by solenoid coil means enclosed by a housing of magnetic material and operable when said coil means is energized to move said armature from its normal extended position to its fully retracted position axially of said solenoid coil means, and operating means for said movably supported means including a plurality of spring means having substantially different spring rates interposed between said movably supported means and said armature means for moving said movably supported means between the first and second positions thereof in time delayed sequence to the movement of said armature means away from the extended and toward the retracted position thereof when said solenoid coil means is energized.

3,988,707

SWING OUT LOAD COIL ASSEMBLY

Jesse Lee Moser, Highpoint; Robert Philmore Reavis, Statesville, and Melvin Andrew Soderstrom, Advance, all of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 14, 1974, Ser. No. 523,952
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² H01F 15/02
U.S. Cl. 336—65 **8 Claims**



1. In combination with a multi-conductor cable element comprising a plurality of pairs of associated conductors, an improved loading coil assembly for connecting a coil to each of said pairs, said assembly having a plate-like member extending transverse to the local axis of said cable with said cable extending through an opening in the center of said plate-like member, and a coil tray mounted on said plate-like member, said coil tray having a bottom surface with a number of holes therein with upstanding walls extending from said bottom surface to form a number of separate cells, each cell being laterally displaced from said cable element and containing a loading coil, the improvements comprising:

an upstanding surface located on the periphery of said tray, said surface having a top side and a bottom side, the latter being adjacent to the bottom surface of said coil tray,

a plurality of side-by-side terminals located on said upstanding surface, each of said terminals having first and second spaced-apart wire receiving portions, adjacent to opposite ends thereof, all of said first wire receiving portions being identical and being located adjacent to the top side of said upstanding surface, and all of said second wire-receiving portions being identical and being located adjacent to the bottom side of said upstanding surface,

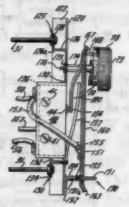
a plurality of conductors extending outward from said multi-conductor cable element, across the top of said cells, and across the top side of said upstanding surface, each of said conductors being affixed to one of said first wire-receiving portions of said terminals, and

coil wires extending from each of said coils through said holes in said bottom surface and across the bottom side of said upstanding surface, each of said conductors being affixed to one of said second wire receiving portions of said terminals at a point spaced from said coil, whereby all of the connections of said conductors and said coil wires to said terminals are accessible.

3,988,708
CONTROLLED DROOP THERMOSTAT

John B. Thorsteinsson, and Herbert T. Hazleton, both of Brandon, Canada, assignors to Federal Pioneer Electric Limited, Toronto, Canada

Claims priority, application Canada, Dec. 3, 1974 213922
Filed July 11, 1975, Ser. No. 595,225
Int. Cl.² H01H 37/52
U.S. Cl. 337—379 12 Claims

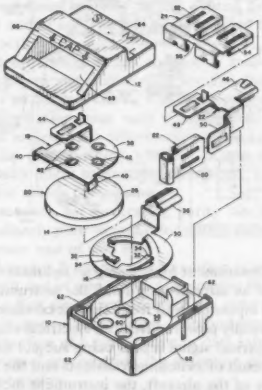


1. A thermostat for controlling the current in a load in response to ambient temperature, including a switch, cam means for adjusting the set-point of the thermostat and ambient temperature sensing means for controlling the switch, said ambient temperature sensing means comprising an elongated ambient temperature sensing bimetal element, a compensating bimetal element having a portion that is integral with a portion of the ambient temperature sensing bimetal element with the high expansion surfaces of the integrated portions of the bimetal elements facing in the same direction, said bimetal elements being disposed to act differentially on the switch in response to changes in temperature, and said compensating bimetal element being more closely heat-coupled to the switch than any incidental heat coupling of the ambient temperature sensing bimetal element with the switch.

3,988,709
ELECTRIC MOTOR CONTROLLING RELAY

Eugene T. McKinnon, Pacific Palisades; Alvin S. Drutz, Los Angeles, and Randall C. Danta, Reseda, all of Calif., assignors to Eugene T. McKinnon, Pacific Palisades and Alvin S. Drutz, Los Angeles, both of, Calif., part interest to each

Filed May 12, 1975, Ser. No. 576,550
Int. Cl.² H01C 1/08
U.S. Cl. 338—57 14 Claims

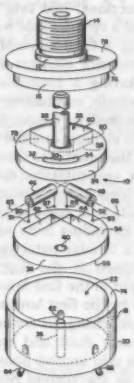


1. In an electric motor controlling relay of the type for controlling motor starting windings; the combination of: a case; a thermistor sandwich assembly in said case comprising a wafer-like thermistor with contact plates at opposite faces thereof in abutting electrical contact therewith, one of said contact plates having resiliently compressible means thereon against its thermistor face for exerting compressive forces in said assembly between said contact plates, said resiliently compressible means of said one contact plate being a plurality of equally spaced and circumferentially extending spring fingers formed integral on said one contact plate, said spring fingers extending generally toward and contacting said one contact plate thermistor face at spaced locations thereon, the other of said contact plates having a plurality of projections formed integrally thereon and extending toward its thermistor face, said projections contacting said other contact plate thermistor face at locations generally aligned with said locations of said contact by said one contact plate spring fingers; surface means on said case oppositely abutting said sandwich assembly contact plates for retaining said compressive assembly; electrical transmission means operably connected to each of said sandwich assembly contact plates for transmitting electrical energy through said sandwich assembly.

3,988,710
CONTACTLESS LINEAR ROTARY POTENTIOMETER

Edward Frank Sidor, Lombard, and Frank B. Desio, Melrose Park, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Nov. 24, 1975, Ser. No. 634,807
Int. Cl.² H01L 43/08
U.S. Cl. 338—32 R 10 Claims



1. A rotary contactless potentiometer comprising first and second elongated sensing elements, each of which have a substantially straight longitudinal axis and are shaped to form a rectangular projection in a plane, said sensing elements being positioned so that said elongated axis intersect to form a first angle which is less than 180°, at least one permanent magnet positioned adjacent said sensing elements, rotation means coupled to said permanent magnet to provide for the rotation thereof and limit means constructed to limit the range of rotation of said permanent magnet by said rotation means relative to said sensing elements, said permanent magnet being shaped to have first and second substantially straight sides each of which passes adjacent one of said rectangular projections so as to intersect the associated longitudinal axis of said sensing elements, said sides lying along lines that intersect to form a second angle that faces said first angle and is less than 180° and is further limited so that neither of said sides can pass beyond the outer edges of the respective projection adjacent said side over the limited range of rotation of said permanent magnet that is allowed by said limit means, and so that the total area of said projections that are positioned adjacent said permanent magnet is substantially constant regardless of the relative position of said permanent

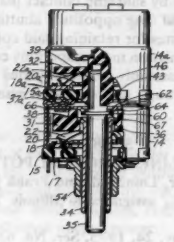
magnet and said sensing elements within said limited range of rotation.

3,988,711

TANDEM ELECTRICAL CONTROL

John D. Van Benthuysen, Elkhart, Ind., and Thomas W. Flanders, Edwardsburg, Mich., assignors to CTS Corporation, Elkhart, Ind.

Filed June 27, 1974, Ser. No. 483,624
Int. Cl.² H01C *10/16*
U.S. Cl. 338—134 **7 Claims**



1. A tandem electrical control comprising first and second cup-shaped housing sections, said first housing section containing an end wall and a circular side wall, each of said housing sections containing a base assembly having a dielectric base supporting a resistance element and a collector and a contactor assembly having a rotatable driver of dielectric material and an electrically conductive contactor secured to the driver and constrained to rotate therewith for wipingly engaging the resistance element and the collector, termination means for connecting the resistance element and the collector to an electrical circuit, said rotatable driver of said first housing section being provided with a bottom surface and containing a bearing surface adjacent said end wall of the first housing section and a recess extending from said bottom surface to said bearing surface, a tubular outer shaft engaging the contactor assembly contained in the first housing section and rotatable with the driver in the first housing section, the outer shaft being supported by the first housing section, and energy absorption means comprising an inner shaft concentrically disposed with said outer shaft and engaging the contactor assembly contained in said second housing section and rotatable with the driver in the second housing section, and an energy absorber integral with said inner shaft and containing a first surface and a second surface spaced apart from said first surface and substantially parallel thereto, said first surface being adjacent said end wall of said first housing section and the second surface being adjacent to the bottom surface of the driver, said inner shaft being made of molded thermo-plastic containing glass fibers, the amount of glass fibers in the glass-filled molded thermo-plastic of said inner shaft being in the range of 1–70 percent.

3,988,712

MULTIPLEX DATA COMMUNICATION SYSTEM EXPLORATION SURVEYS

G. Dale Ezell, and George L. Steckmann, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

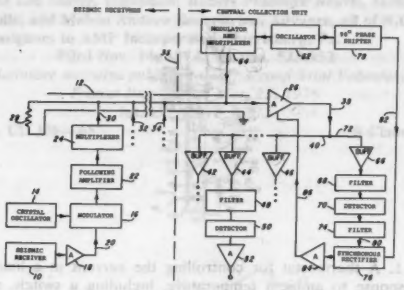
Filed Nov. 27, 1974, Ser. No. 527,912
Int. Cl.² G01V *1/22*
U.S. Cl. 340—15.5 TS **25 Claims**

1. A cable system for coupling the signals induced at a plurality of sensors to a central collecting unit, said cable system comprising:

a. a transmission line for providing an output signal at said collecting unit,

b. termination means on said transmission line such that the impedance seen looking onto the line at any point along its length is approximately constant as a function of location along the line,

c. means for modulating a carrier signal having a distinct frequency at at least two of said sensors, each modulating signal being an electrical signal representative of the output of a sensor, and



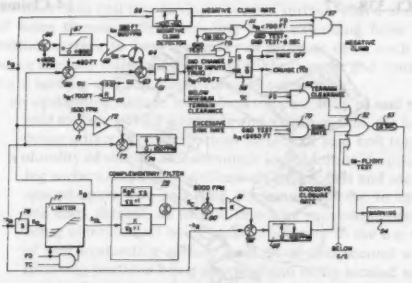
d. an independent current summer for each modulated carrier signal, wherein each said current summer comprises an amplifier having an output impedance substantially greater than one-half the characteristic impedance of said transmission line, each current summer being responsive to the corresponding modulated carrier signal and adapted to provide on said transmission line a current representative of said corresponding modulated carrier signal whereby the modulated carrier signals are frequency division multiplexed onto said transmission line.

3,988,713

AIRCRAFT GROUND PROXIMITY WARNING INSTRUMENT

Charles Donald Bateman, Bellevue, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Division of Ser. No. 480,727, June 19, 1974, Pat. No. 3,946,358. This application Mar. 5, 1975, Ser. No. 555,680
Int. Cl.² G01C *5/00*
U.S. Cl. 340—27 R **2 Claims**



1. An aircraft instrument for warning an operator of dangerous proximity of an aircraft to ground, the instrument having electrical signal inputs derived from aircraft condition sensors which are electrically powered from an electrical supply of the aircraft, the electrical signal inputs being subject to transient variations as a result of switching transients and the like in the electrical supply of the aircraft, the instrument including:

a plurality of signal detectors, each responsive to different combinations of aircraft condition electrical signal inputs for generating a ground proximity warning signal on the occurrence of dangerous proximity of the aircraft to

ground, each detector having a logic output which changes state on occurrence of an aircraft condition of dangerous proximity to ground, and subject to transient variations in the electrical signal inputs to generate a false warning signal;

an OR gate having plural inputs with one input connected to each detector, said OR gate having an output;

a warning means connected with the output of said OR gate; and

a single time delay circuit connected between the output of said OR gate and said warning means for preventing actuation of said warning means by a transient generated false warning signal.

3,988,714

COMPUTER INPUT/OUTPUT APPARATUS FOR PROVIDING NOTIFICATION OF AND DISTINGUISHING AMONG VARIOUS KINDS OF ERRORS

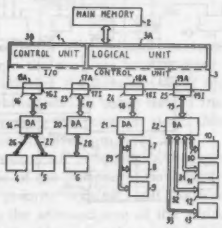
Angelo Bardotti, Cesano Boscone (Milan), Italy, assignor to Honeywell Information Systems Italia, Caluso, Italy

Filed Sept. 9, 1975, Ser. No. 611,721

Claims priority, application Italy, Sept. 13, 1974, 27258/74

Int. Cl.² H04L *1/10, 1/16;* **G06F** *11/10*

U.S. Cl. 340—146.1 AG **4 Claims**



1. An integrated interface for providing communication between the central processor and peripheral units of a computer system, wherein the transfer of control information or of data information is preceded by the transmittal of control character information from the central processor, comprising:

a channel having a bidirectional bus for transferring information therethrough and having lines for transferring signals therethrough in a single direction, one end of said channel being coupled to said central processor and the other end of said channel being coupled to at least one of said peripheral units; and

error identification means coupled to said channel for detecting errors in information and for distinguishing such errors as channel errors, which are errors due to transfer of information over said channel, and logical errors, which are errors in information applied to said channel, and for distinguishing whether or not such errors will adversely affect subsequent operations, said error identification means comprising:

a first network for generating parity bits for information immediately prior to said information entering the central processor end of said bus;

a first detector for sensing information leaving the peripheral unit end of said bus and responsive thereto for generating a first signal representing the detection of a parity error in control information, a second signal representing the detection of a parity error in data information, and a third signal representing the detection of a logical error in information;

a second network for generating parity bits for information immediately prior to said information entering the peripheral unit end of said bus;

a second detector for sensing information leaving the central processor end of said bus and responsive thereto for generating a fourth signal representing the detection of a parity error in said information;

a first circuit responsive to the signals generated by said first detector for initiating a signal exchange on said lines of said channel to represent the occurrence of an error in information received from the peripheral unit end of said bus;

a second circuit responsive to said first and second signals for generating a fifth signal representing the occurrence of a parity error in information received from the peripheral unit end of said bus;

a third circuit responsive to said fourth signal for generating signals respectively representing, in data information leaving the central processor end of said bus, the occurrence of a parity error in control information and a parity error in data information; and

a fourth circuit responsive to said signal exchange and said fifth signal for generating signals respectively representing, in information leaving the peripheral unit end of said bus,

i. the occurrence of a parity error in control information,

ii. the occurrence of a parity error in data information, and

iii. the occurrence of a logical error in control information.

3,988,715

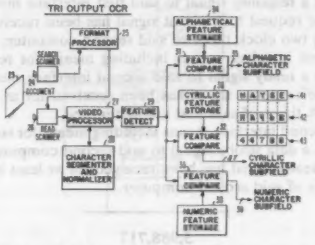
MULTI-CHANNEL RECOGNITION DISCRIMINATOR

Philip J. Mullan, Rockville, and Walter S. Rosenbaum, Silver Spring, both of Md., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,618

Int. Cl.² G06K *9/00*

U.S. Cl. 340—146.3 S **13 Claims**



1. A method for discriminating among $n>2$ genre character-sets within an alpha-numeric character field scanned by a character recognition machine adapted to scan characters in an alpha-numeric character field, and adapted to output along each of respective $n>2$ output lines associated $n>2$ genre character-set characters, each of which most nearly match a character scanned as a respective genre character-set character for all characters scanned in said character field, comprising the steps of:

storing in each of $n>2$ storage means connected to said $n>2$ output lines, a conditional probability that a certain respective genre character-set character was inferred by the character recognition machine given that the other genre character-set characters were scanned;

accessing said $n>2$ storage means to yield respective $n>2$ conditional probabilities that each respective genre character-set character inferred was misread by the character recognition machine;

multiplying all of the respective $n>2$ conditional probabilities separately for each of the genre character-sets inferred by the character recognition machine along the aforesaid $n>2$ output lines so as to develop respective $n>2$ total conditional probabilities; and

comparing in a comparator the magnitudes of each of the $n>2$ total conditional probabilities so as to correlate the correct one of the genre character-set characters inferred

by the character recognition machine with the greatest magnitude total conditional probability.

3,988,716

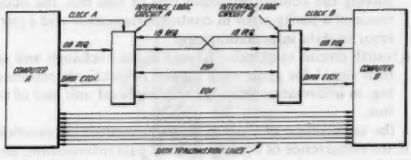
COMPUTER INTERFACE SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Tage O. Anderson, Arcadia, Calif.

Filed Aug. 5, 1974, Ser. No. 495,022

Int. Cl.² G06F *15/16*

U.S. Cl. 340—172.5 8 Claims



1. Apparatus for controlling the transfer of data from a first computer to a second computer, said computers having asynchronous clocks, said apparatus comprising:

first interface means associated with said first computer;

second interface means associated with said second computer;

said first interface means including means responsive to said first computer for transmitting a request to transmit signal to said second interface means;

said second interface means including means for responding with a response signal to said first interface means, only if the request to transmit signal has been received for at least two clock times of said second computer;

said first interface means including means for responding with a ready signal to said second interface means, only if the response signal has been received for at least two clock times of said first computer; and

said second interface means including means for responding with a data strobe signal to said second computer, only if the ready signal has been received for at least two clock times of said second computer.

3,988,717

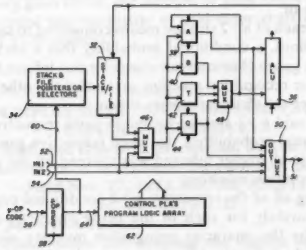
GENERAL PURPOSE COMPUTER OR LOGIC CHIP AND SYSTEM

Andrew P. Kisylia, Agoura, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Aug. 6, 1975, Ser. No. 602,302

Int. Cl.² G06F *1/00*

U.S. Cl. 340—172.5 15 Claims



1. A computer system comprising:

arithmetic unit including a first plurality of identical general purpose computer chips;

micro-code control section including a second plurality of the same general purpose computer chips;

means including a computer system control memory for receiving address input information from said micro-code control section and applying micro-code control signals to each of said general purpose computer chips; and

storage means for supplying stored information to said general purpose computer chips from selectively addressed storage locations.

3,988,718

LOGIC CONTROL SYSTEM

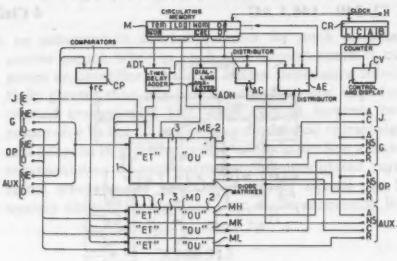
Gérard Filloux, Chevilly Larue, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Dec. 13, 1974, Ser. No. 532,571

Claims priority, application France, Dec. 20, 1973, 73.45710

Int. Cl.² G05B *11/00*

U.S. Cl. 340—172.5 6 Claims



1. Logic control system enabling the monitoring of the automatic operation of the elements or of a set of elements, and capable of co-operating with other control or monitoring units, more particularly in telecommunications for the monitoring of a set of junctors, the system comprising, a memory containing data reflecting the situation of the monitored junctors, an addressing counter, each position of the counter addressing a corresponding junctor and at least one word of the memory containing data concerning the addressed junctor, the system further comprising a first logic assembly formed by an "AND" logic circuit, an "OR" logic circuit and inverters, auxiliary circuits receiving data from the memory and from the logic assembly for updating the memory data, the said first logic assembly receiving as input variables data from the monitored junctors, from said auxiliary circuits, from the memory and from said other control or monitoring units and delivering as output variables Boolean functions of said input data, the outputs of the logic assembly being connected to said junctors, auxiliary circuits, memory and other control or monitoring units.

3,988,719

MICROPROGRAMMED DATA PROCESSING SYSTEMS

Anthony Maurice Whitby; John Martin Harper, both of Hitchin, and Brian John Procter, Welwyn, all of England, assignors to International Computers Limited, Stevenage, United Kingdom

Filed Apr. 8, 1974, Ser. No. 459,187

Claims priority, application United Kingdom, Apr. 13, 1973, 17864/73

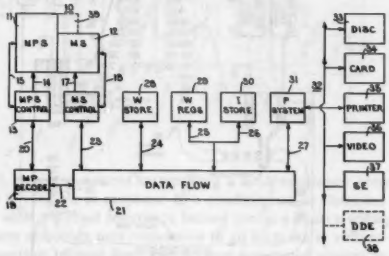
Int. Cl.² G06F *9/18*

U.S. Cl. 340—172.5 3 Claims

1. A data processing system comprising:

a. a program store;

b. a plurality of program address registers for holding program addresses relating to respective program levels of operation;
c. a program level register;
d. a plurality of peripheral devices associated with respective ones of said program levels;
e. priority means, responsive to interrupt request signals from the peripheral devices, for selecting the highest priority one of said interrupt request signals and producing an interrupt program level indication representating the program level associated with the peripheral device which originated said highest priority request;



f. interrupt means for loading said interrupt program level indication into the program level register;
g. means for utilising the program level indication in the program level register to select one of the address registers for addressing the program store, thereby activating the corresponding program level; and
h. data path means for receiving a program start address from the one of the peripheral devices which originated the highest priority request, and for writing that start address into the selected one of the address registers to provide a start address for the activated program level.

3,988,720

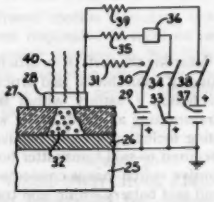
RECORDING AND RETRIEVING INFORMATION IN AN AMORPHOUS MEMORY MATERIAL USING A CATALYTIC MATERIAL

Stanford R. Ovshinsky, Bloomfield Hills, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Division of Ser. No. 161,219, July 9, 1971, Pat. No. 3,868,651, which is a continuation-in-part of Ser. No. 63,404, Aug. 13, 1970, abandoned. This application Feb. 3, 1975, Ser. No. 546,312

Int. Cl.² G11C *13/08, 11/42, 27/00*

U.S. Cl. 340—173 LS **23 Claims**



7. Apparatus for recording and retrieving information comprising a layer of substantially disordered and generally amorphous memory material which has one structural condition which is substantially disordered and generally amorphous and having one detectable characteristic, which is capable of having at least a portion thereof physically changed to another structural condition having another detectable characteristic, which has internal biasing forces toward said other structural condition, and which has internal inhibitions against the action of said biasing forces, a catalytic material for said layer which is catalytically capable of increasing said biasing forces and decreasing said inhibitions against the action of said biasing forces of the memory material, means for applying electrical energy to at least a portion of said layer of memory material for activating the catalytic material at said at least portion of the layer and physically changing said layer at said at least portion of the layer from said one detectable structural condition which is substantially disordered and generally amorphous to said other detectable structural condition to record information in said layer, and means for detecting the detectable structural condition of said at least portion of said layer of memory material as to whether said at least portion is in said one detectable structural condition which is substantially disordered and generally amorphous or in said other detectable structural condition to retrieve the information recorded in said layer.

3,988,721

PLUG-IN TYPE PROGRAM STORAGE

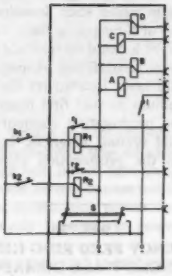
Peter Frutiger, Wangen, Switzerland, assignor to Anstalt Europaische Handelsgesellschaft, Vaduz, Liechtenstein

Continuation of Ser. No. 470,045, May 15, 1974, abandoned. This application Jan. 16, 1976, Ser. No. 649,687

Claims priority, application Switzerland, May 30, 1973, 7840/73

Int. Cl.² G11C *17/00, 13/00*

U.S. Cl. 340—173 R **4 Claims**



1. Program storage apparatus for use with an electrical data processing device having a plurality of active switching elements of a selected electrical type, each active switching element having an input and an output, said apparatus comprising:

a plurality of continuously electrically reprogrammable active unitary storage elements of the same electrical type as said active switching elements, each unitary storage element having an input circuit adapted to receive a plurality of input states of a control signal from said output of an associated active switching element, each unitary storage element having an output circuit separate from said input circuit and adapted to settably assume one of a plurality of output states responsive to an associated one of said each element input states, each said unitary storage element output circuit controlling a quantity of electrical energy greater than another quantity of electrical energy supplied to said input circuits; and

means for substantially simultaneously directly electrically connecting each of said unitary storage element input and output circuits to a corresponding one of the inputs and outputs of said switching elements when said program storage apparatus is installed at said electrical data processing device and for substantially simultaneously disconnecting all of said unitary storage element input and output circuits from said switching elements when said

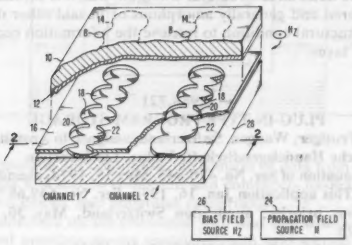
program storage apparatus is removed from said electrical data processing device.

3,988,722

SINGLE SIDED, HIGH DENSITY BUBBLE DOMAIN PROPAGATION DEVICE

George E. Keefe, Montrose; Mark H. Kryder, Yorktown Heights, and Yeong S. Lin, Mount Kisco, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1974, Ser. No. 537,804
Int. Cl.[2] G11C 11/14
U.S. Cl. 340—174 TF 12 Claims



1. A structure for moving magnetic bubble domains in an amorphous medium in which such domains exist in response to the reorientations of a magnetic field, comprising:

a first magnetic layer located on one side of said amorphous magnetic medium for defining propagation elements,

a second magnetic layer located on the same side of said amorphous medium as said first magnetic layer and for defining second propagation elements, the propagation elements in said second magnetic layer being laterally displaced from the propagation elements in said first magnetic layer.

3,988,723

HALF-FREQUENCY FEED RING GENERATOR OF SINGLE WALL DOMAINS

Le Roy J. Kochel, Fridley, and Stanley J. Lins, Minneapolis, both of Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,105
Int. Cl.[2] G11C 11/02
U.S. Cl. 340—174 TF 3 Claims

1. A bubble memory system, comprising:

a layer of magnetizable material in which magnetic bubbles may be generated and moved about;

a closed loop feed ring having a merging input channel;

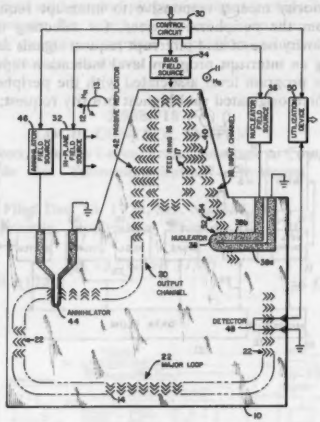
a bias field H_B directed normal-to-the-plane of said layer;

a rotating in-plane field H_R directed in the plane of said layer and rotating at a frequency of F_R;

said feed ring and said input channel being comprised of a plurality of stable positions arranged in a predetermined path for moving bubbles therealong when subjected to the conjoint action of said bias field H_B and said in-plane field H_R;

a generator inductively coupled to said input channel for generating bubbles in said input channel at a frequency that is one half the frequency F_R of said in-plane field H_R, said so generated bubbles occupying alternate, or every other, stable position in said input channel;

first and subsequent bubbles that are generated by said generator in said input channel entered into said feed ring at the merging portion of said input channel and said feed ring and then traversing said feed ring one complete cycle while in alternate stable positions, and then the bubbles in said input channel entering said feed ring in the other alternate stable positions not occupied by said first and



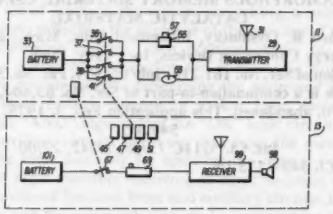
subsequent bubbles for occupying all the stable positions in said feed ring.

3,988,724

THEFT ALARM

David John Anderson, 3795 Whiting Manor Lane, Glendale, Calif. 91208

Filed July 17, 1975, Ser. No. 596,675
Int. Cl.[2] G08B 1/08
U.S. Cl. 340—224 11 Claims



1. A system for detecting the theft of an article comprising

a transmitter housing securable to said article;

a transmitter including a battery within said transmitter housing for transmitting an alarm signal when activated;

a receiver housing including a radio receiver and battery removeably secured to said transmitter housing;

a position responsive switch means connected between said transmitter and said battery within said transmitter housing;

a magnetically activated normally-closed switch means connected between said battery within said transmitter housing and said position responsive switch means; and

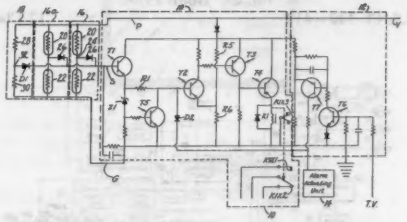
magnetic means in said receiver housing for maintaining said magnetically actuated switch means in an open position when said receiver housing is secured to said transmitter housing.

3,988,725

DETECTOR SYSTEM

William F. Doherty, Halifax, Mass., assignor to Pyrotector, Incorporated, Hingham, Mass.

Filed Dec. 12, 1973, Ser. No. 423,934
Int. Cl.² G08B 17/12
U.S. Cl. 340—228 R 6 Claims



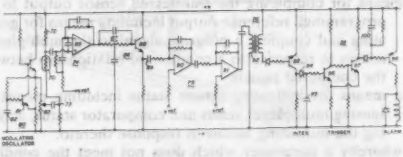
1. A detector system comprising a first resistance means which is variable in response to a condition to be detected in series with a second resistance means across a source voltage, an alarm actuating unit responsive to an increase in voltage at the junction of said first and second resistance means to a predetermined percentage of the source voltage to actuate an alarm, and means applying a supervisory voltage to the junction which is proportional to the source voltage and less than the voltage required to actuate the alarm, and means responsive to the dropping of the supervisory voltage to a predetermined lesser percentage of the source voltage to actuate means for indicating said drop in voltage.

3,988,726

INFRARED INTRUSION DETECTION APPARATUS

Martin H. Reiss, Newton, and Elias E. Solomon, Duxbury, both of Mass., assignors to Gulf & Western Manufacturing Company, New York, N.Y.

Division of Ser. No. 394,065, Sept. 4, 1973, Pat. No. 3,886,360. This application Mar. 17, 1975, Ser. No. 558,636
Int. Cl.² G08B 13/18
U.S. Cl. 340—258 D 17 Claims



17. An infrared motion detecting system comprising; a sensing element responsive to received radiation, means for biasing the sensing element so that it is operative, means establishing an alternating signal, and means coupling the alternating signal to the sensing element to modulate the output signal therefrom.

3,988,727

TIMED SWITCHING CIRCUIT

Charles E. Scott, Indianapolis, Ind., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed June 24, 1974, Ser. No. 482,650
Int. Cl.² G08B 7/00
U.S. Cl. 340—309.1 8 Claims

1. A timed switching circuit for controlling the operation of an appliance comprising in combination:

a. means connecting said timed switching circuit to an alternating current power supply;

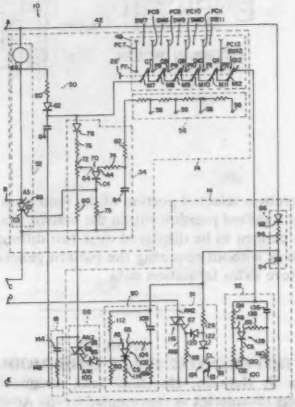
b. an alarm timer means providing an audible alarm at predetermined time intervals;

c. a function timer means connected to said alarm timer means for providing an operational sequence at predetermined time intervals;

d. a power supply means connected between first and second sides of said timed switching circuit;

e. an on-delay timing means connected to said power supply means for producing a predetermined time delay before power is applied to said appliance from said alternating current power supply;

f. power-turn on means connected to said on-delay timing means for turning power on from said power supply means;



g. an off-delay timing means connected to said function timer means producing a time delay after power is disconnected through said power turn-on means;

h. a power turn-off means connected to said off-delay timing means for maintaining power during said time delay and subsequently turning off power from said power supply means;

i. snubber means connected to said power turn-on means to prevent same from turning on momentarily at the beginning of a timing cycle; and

j. an appliance control/indicator means connected to said appliance for controlling a function and indicating a state of operation of same.

3,988,728

GRAPHIC DISPLAY DEVICE

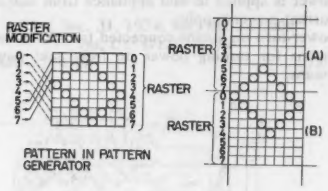
Tadanari Inoue, and Takashi Shinbata, both of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed Oct. 20, 1975, Ser. No. 623,950
Int. Cl.² G06K 15/20
U.S. Cl. 340—324 AD 12 Claims

1. A graphic display device of the type receiving instruction from an external computer and, by scanning a succession of rasters in individual display matrices, displaying alphanumeric or graphic patterns upon a cathode ray tube, the graphic display device having a pattern generator for storing pattern data in raster form and for generating a series of raster display signals for a display matrix upon receiving a pattern address signal designating the particular pattern to be formed and a repeating raster designation signal designating the individual rasters of the selected pattern to be scanned, the display device being characterized by:

pattern shifting means for shifting, on demand and in an amount selected by the external computer, the display of a pattern in a direction transverse to the direction of

raster scanning, said pattern shifting means comprising means for modifying the raster designation signal applied to the pattern generator to thereby relocate the individual rasters of the stored pattern within the display matrix being formed,



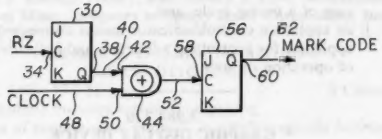
whereby a selected portion of the pattern may be displayed at a shifted position within the matrix, thereby permitting a pattern to be displayed over two different display matrices without requiring the pattern generator memory to store extra formation data.

3,988,729

DIFFERENTIAL PULSE CODE MODULATION

Calvin F. Herman, Houston, Tex., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 29, 1975, Ser. No. 545,283
Int. Cl.² H04L 3/00
U.S. Cl. 340—347 DD **7 Claims**



1. An apparatus for differentially encoding digital data present in a succession of data bit intervals, comprising:

a. means for generating a clock signal defining the occurrence time for bit time transition points to be at substantially one-half the duration of the data bit intervals;

b. means cooperative with said clock signal generating means for causing a transition in signal level changes between successive bit time transition points occurring during successive data bit intervals in response to a first digital data level; and

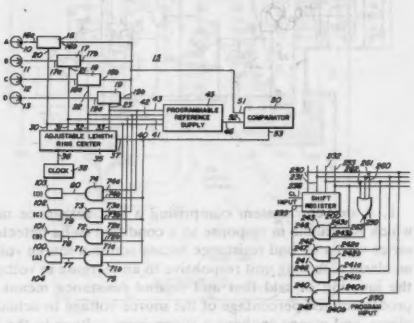
c. means for causing no transition in signal level changes between successive bit time transition points in response to a second digital data level, whereby the data is represented by the presence or absence of data level changes between successive bit time transitions during successive data bit intervals.

3,988,730

MULTIPLE PARAMETER MONITORING AND READOUT SYSTEM WITH SAMPLING OF PARAMETERS OF HIGHER PRIORITY THAN THE HIGHEST PARAMETER WHICH IS OUT OF TOLERANCE

Henry W. Valker, Wood Dale, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 31, 1974, Ser. No. 537,746
Int. Cl.² G08B 19/00
U.S. Cl. 340—412 **17 Claims**



2. A system for monitoring and indicating a plurality of prioritized parameters comprising:

a plurality of sensors, at least one sensor located at each parameter site, each sensor producing an electrical output proportional to the magnitude of the sensed parameter,

a multiplexing means sequentially sampling and transferring the sensor outputs in prioritized order, and programmable to return to the highest priority sensor in response to a program signal,

a programmed reference means sensing the status of the multiplexing means and providing an output of variable magnitude predeterminedly fixed and dependent in response thereto,

means for comparing the transferred sensor output to the programmed reference output including means for generating and coupling a program signal to the multiplexing means in response to a conditional relationship between the compared signals,

a means for indicating sensor status including means for sensing multiplexer status and comparator status, activating the indicating means in response thereto,

whereby a parameter which does not meet the condition dictated by its reference is indicated, the multiplexing means thereafter sensing only the out of condition parameter and all higher priority parameters.

3,988,731

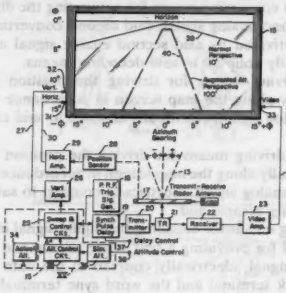
AUGMENTED PERSPECTIVE RADAR DISPLAY

David W. Young, 627 N. Beachwood Dr., Burbank, Calif. 91506

Continuation-in-part of Ser. No. 385,534, Aug. 3, 1973, Pat. No. 3,896,432. This application May 28, 1975, Ser. No. 581,638
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 LS **19 Claims**

1. A method of altering the display provided by a perspective radar system to provide a display in a perspective as would appear if the observer were at a different position from his actual position comprising modifying the sweep wave form voltage function applied to the vertical input of the display to

correspond substantially to that which would be generated if the radar antenna were at said different position whereby the



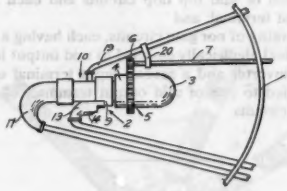
targets viewed on the display assume the positions they would if the observer were actually at said different position.

3,988,732

3-CHANNEL SELECTABLE POLARIZATION, TARGET DISCRIMINATION ANTENNA

Orville G. Brickey, Indianapolis, Ind., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 22, 1965, Ser. No. 515,740
Int. Cl.[2] H01Q *15/24*
U.S. Cl. 343—100 PE 7 Claims



1. A monopulse radar antenna feed comprising:

a radio frequency energy comparator having a first sum port, a difference port, and a second sum output means including a coupling probe, said comparator being supported on the radar antenna by a first sum waveguide and a difference waveguide coupled in alignment with said first sum port and said difference port, respectively; and

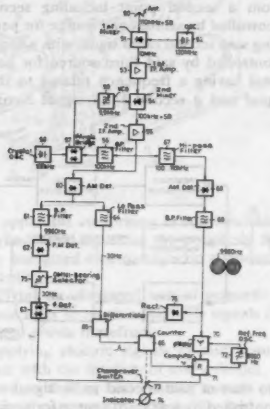
a rotatable circular polarizing means coupled to said comparator providing circular polarization of the transmitted energy, the return of which is separated in said comparator so that energy reflected with an even number of bounces from a target is received through said first sum port while energy reflected with an odd number of bounces from a target, which energy is therefore cross-polarized with respect to said first sum port, will be received through said second sum coupling probe thus providing target discrimination and precipitation clutter rejection.

3,988,733

VOR RECEIVER WITH IMPROVED PERFORMANCE IN A DOPPLER NAVIGATION SYSTEM

Karl Kohler, Ditzingen, Heimerdingen, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Apr. 22, 1974, Ser. No. 462,645
Int. Cl.[2] G01S *1/38*
U.S. Cl. 343—106 D 3 Claims



1. In a VOR airborne receiver for providing air derivation of azimuth angle data at least from an alternating side band type ground beacon, the latter providing signal transmissions successively from each of n contiguous radiators arranged on a circle, and from a reference antenna substantially at the center of said circle, said signal transmission including a sequence of half-wave-shaped signals of frequency on the order of 9960 Hz as a modulation of a higher carrier frequency and with a repetition frequency on the order of 30 Hz, the latter corresponding to the rate of commutation of said circle of radiators, said 30 Hz being air derivable as a reference signal; the combination comprising:

means within said receiver for measuring the phase of said half-wave-shaped signals received from each of said radiators with respect to said reference antenna to produce a sequence of phase values repetitive at said rate of commutation of said circle of radiators, said phase values being influenced by multi-path as well as direct signals from said ground beacon;

and means for responsive to said sequence of phase values for determining a value thereof representative of the azimuth of said receiver with respect to said sequence and phase comparison against said 30 Hz reference frequency.

3,988,734

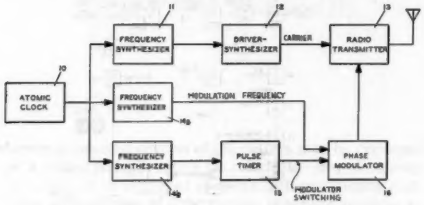
METHOD OF AND SYSTEM FOR LOCATING A POSITION

Albert A. Elwood, 4390 Westroads Drive, West Palm Beach, Fla. 33407

Continuation-in-part of Ser. No. 186,206, Oct. 4, 1971, Pat. No. 3,797,015, Continuation-in-part of Ser. No. 186,136, Oct. 4, 1971, Pat. No. 3,839,719, Continuation-in-part of Ser. No. 186,112, Oct. 4, 1971, Pat. No. 3,816,832, Continuation-in-part of Ser. No. 833,638, June 16, 1969, Pat. No. 3,613,095.
This application Mar. 8, 1974, Ser. No. 449,453
Int. Cl.[2] G01S *5/14*
U.S. Cl. 343—112 R 43 Claims

1. A position locating system using phase of carrier signals and phase modulation signals thereon to develop respectively fine and coarse position location data, the system comprising

a first source of a signal of given frequency and given phase, a second source of a signal of said given frequency and a predetermined phase relationship with said given phase, a third source of a signal of said given frequency and a predetermined phase relationship with said given phase, means controlled by said first source for transmitting a first radio signal from a first point including first phase modulating means controlled by said first source for periodically phase modulating said first radio signal with a first time signal, means controlled by said second source for transmitting a second radio signal from a second point including second modulating means controlled by said second source for periodically phase modulating said second radio signal with a second time signal, means controlled by said third source for generating a first local signal having a frequency related to that of said first radio signal and a second local signal having a frequency



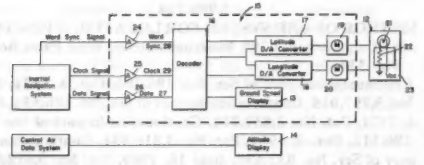
related to that of said second radio signal at a third point, means controlled by said third source for periodically producing time reference signals, means receiving said first radio signal and said second radio signal at said third point for developing respective signals therefrom having respective frequencies identical to the frequencies of said first local signal and of said second local signal, first phase comparing means at said third point for comparing the phase of said first local signal with that of the corresponding signal developed from said first radio signal, second phase comparing means at said third point for comparing the phase of said second local signal with that of the corresponding signal developed from said second radio signal, phase demodulator means at said third point for recovering said first time signal and said second time signal, and means for comparing respectively said first time signal and said second time signal with said time reference signals.

3,988,735

CONTROL CIRCUIT FOR DRIVING A POSITION INDICATOR IN AN AIRCRAFT FLIGHT DATA DISPLAY

William E. Bennett, 2393 S. Windward Cir., Westlake Village, Calif. 91360, and Imon E. Leach, 1711 Stoner Ave., Los Angeles, Calif. 90025

Filed June 2, 1975, Ser. No. 582,623
Int. Cl.[2] G01S 3/02
U.S. Cl. 343—112 PT **4 Claims**



1. In an aircraft flight data display, a device for controlling the movement of the position indicator on a map screen displaying the location of an aircraft, wherein a navigational system continuously provides information, in the form of digital signal containing a plurality of bits, regarding the latitude, longitude and ground speed of the aircraft from its data terminal, a clock signal from its clock terminal and a word sync signal from its word sync terminal, said device including:

a. a first converting means for converting the digital data to a first analog signal, said first converting means being activated by said first enable signal and being electrically coupled to said decoding means;

b. a second converting means for converting the digital data to a second analog signal, said second converting means being activated by said second enable signal and being electrically coupled to said decoding means;

c. first driving means for driving the position indicator vertically along the map screen in accordance with said first analog signal, electrically coupled to said converting means;

d. second driving means for driving the position indicator horizontally along the map screen in accordance with said second analog signal, electrically coupled to said second converting means; and

e. decoding means for decoding the digital signal into digital data and for providing a first enable signal and a second enable signal, electrically coupled to the data terminal, the clock terminal and the word sync terminal, said decoding means comprising:

1. a serial shift register having a clock terminal, electrically coupled to the clock terminal, an input terminal, electrically coupled to the data terminal, and a plurality of output terminals;

2. a plurality of serially connected flip flop circuits, each having a clock terminal, electrically coupled to the clock terminal, an input terminal, the first of which is electrically coupled to the last of said output terminals of said serial shift register, and a pair of complementary output terminals;

3. a monostable multivibrator having an input terminal electrically coupled to the word sync terminal and an output terminal;

4. an inverter having an input terminal electrically coupled to said output terminal of said monostable multivibrator and an output terminal;

5. a plurality of nand gate circuits, each of which has a plurality of input terminals each of which is electrically coupled to one of said complementary output terminals of each of said flip flop circuits and each having an output terminal; and

6. a plurality of nor gate circuits, each having a first input terminal electrically coupled to said output terminal of said inverter and a second input terminal electrically coupled to one of said output terminals of said nand gate circuits.

3,988,736

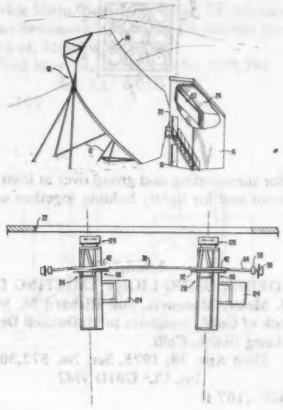
STEERABLE FEED FOR TOROIDAL ANTENNAS

Lewis V. Smith, Jr., Bethesda, and Norman P. Miller, Rockville, both of Md., assignors to Communications Satellite Corporation (Comsat), Washington, D.C.

Filed Nov. 29, 1974, Ser. No. 528,311
Int. Cl.[2] H01Q 3/12
U.S. Cl. 343—761 **8 Claims**

1. A steerable feed for a stationary toroidal antenna having a circular focal arc comprising a stationary support structure spaced from and independent of said antenna, a pair of spaced apart parallel curved guide rails mounted on said structure along an arc parallel to the focal arc of the antenna, at least one antenna feed assembly mounted on said curved guide rails comprising first frame means movably mounted on said curved guide rails, first actuator means for selectively moving said first frame means in opposite directions along said curved guide rails, a pair of spaced apart parallel straight guide rails mounted on said first frame means orthogonal to said curved guide rails, second frame means movably mounted on said

straight guide rails, second actuator means for selectively moving said second frame means in opposite directions along



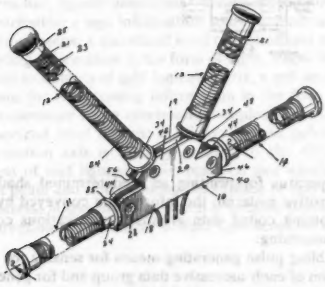
said straight guide rails and feed means for said antenna mounted on said second frame means.

3,988,737

PIVOTED ROD TELEVISION RECEIVING ANTENNA FOR INDOOR USE

Marvin P. Middlemark, 96 Store Hill Road, Old Westbury, L.I., N.Y. 11568

Filed Oct. 2, 1975, Ser. No. 618,793
Int. Cl.² H01Q 9/44, 3/24
U.S. Cl. 343—809 8 Claims



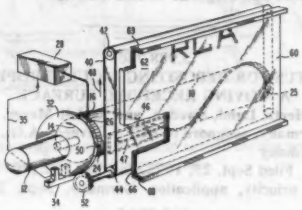
1. An indoor television antenna comprising insulating supporting means, at least four dipole rods connected to said supporting means, and all mutually insulated thereon two of said dipole rods serving as a rearward dipole and said two dipole rods being in alignment and having their inner terminal ends connected to said supporting means, the other two dipole rods being together V-shaped, with their inner terminal ends also connected to said supporting means, all four inner terminal ends being immediately adjacent each other so that the four dipole rods substantially take the form of a K on its side.

3,988,738

DISPLAY DEVICE UTILIZING MAGNETIC STORAGE

Chin Tao Wu, North Brunswick, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 13, 1975, Ser. No. 549,666
Int. Cl.² G03G 19/00; G01D 15/12
U.S. Cl. 346—74.1 5 Claims



1. A display apparatus comprising in combination:

a rotating cylinder having along the periphery thereof an electrically energized electromagnetic transducer in the form of a helix;

means for moving an elongated web of magnetic material opposite said helix to receive magnetic signals from serially presented points therefrom;

means for applying electric signals to said transducer in synchronism with the rotation of said cylinder, said web being moved so that as said cylinder rotates successive magnetic signal patterns are recorded by said transducer on successive portions of said web; and

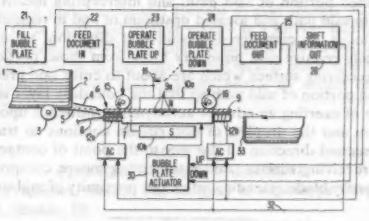
magnetic-to-visual transducer means in proximity to said web bearing said magnetic signal patterns for producing a visual display corresponding to said signal patterns.

3,988,739

INPUT DEVICE FOR SCANNING DOCUMENTS WITH MAGNETIC BUBBLE PRINTING

George J. Fan, Ossining, N.Y., and Eugene Shapiro, Stamford, Conn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 26, 1975, Ser. No. 562,076
Int. Cl.² G03G 19/00
U.S. Cl. 346—74.1 10 Claims



1. A method for recording information from a document having magnetic indicia thereon, said method comprising the steps of:

establishing a bias field relative to a magnetic bubble material;

creating an undisturbed bubble array in said magnetic bubble material in one mode of operation, and shifting information from said magnetic bubble material in another mode of operation, with each mode of operation being under the control of a control means;

positioning said document against said bubble material, with the areas of said document having magnetic indicia

thereon creating a magnetic image of said document on the areas of said magnetic bubble material which are touching said magnetic indicia, by displacement of bubble in said magnetic bubble material; and

activating said control means to initiate said one mode of operation to create said undisturbed bubble array in said magnetic bubble material, and following said positioning, initiating said another mode of operation to shift information from said magnetic bubble material.

3,988,740

APPARATUS FOR DEPOSITING LIQUID DROPLETS ON A MOVING RECEIVING SURFACE

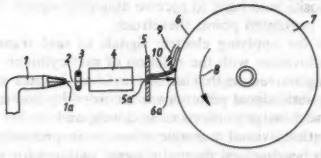
Helmuth Hertz, Lund, Sweden, and Rudolf Meyer, Leverkusen, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 25, 1972, Ser. No. 292,190

Claims priority, application Germany, Sept. 25, 1971, 2147934

Int. Cl.² G01D 15/16

U.S. Cl. 346—75 **8 Claims**



1. Apparatus for depositing liquid droplets on a member having a receiving surface and moving rapidly in a first direction, along a predetermined path, and at a speed sufficiently high to form a pronounced gaseous boundary layer which is adjacent to and moves with said receiving surface in said first direction, comprising a liquid supplying device having an orifice arranged to discharge against said receiving surface a stream of droplets in a second direction so that, in the absence of deflection of said stream, said droplets invariably impinge against said receiving surface at a locus constituting a predetermined portion of said path; and intercepting means adjacent to said path and located upstream of and in register with said locus, as considered in said first direction, to at least partially remove said boundary layer from those portions of said receiving surface which are about to enter said predetermined portion of said path so that the boundary layer is incapable of exerting an adverse aerodynamic infuence upon said stream and the droplets of said stream continue to travel in said second direction all the way to the point of contact with said receiving surface, said intercepting means comprising a stationary blade extending into close proximity of said surface.

3,988,741

ELECTRODE FOR INK JET PRINTING

Stéphane Rossopoulos, Yverdon, Switzerland, assignor to Hermes Precisa International S.A., Yverdon, Switzerland

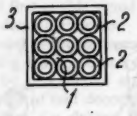
Filed Oct. 1, 1975, Ser. No. 618,364

Claims priority, application Switzerland, Oct. 7, 1974, 13411/74

Int. Cl.² G01D 15/18

U.S. Cl. 346—75 **7 Claims**

1. An electrode for creating a deflecting electrostatic field to control the position of an ink jet issuing from a nozzle nose in ink jet printing using a plurality of these electrodes, said electrode comprising a group of capillary tubes arranged side by side and having their mouths opposite the ink jet, and an



envelope for surrounding said group over at least a part of the length thereof and for tightly holding together said group.

3,988,742

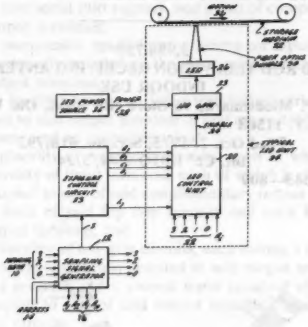
RECORDER USING LIGHT EMITTING DIODES

Michael J. Meier, Monrovia, and Richard M. Malueg, Glendora, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Apr. 28, 1975, Ser. No. 572,306

Int. Cl.² G01D 9/42

U.S. Cl. 346—107 R **83 Claims**



1. Apparatus for printing as predetermined shades on a photosensitive material, the information conveyed by successive incoming coded data groups having various configurations, comprising:

a. enabling pulse generating means for sensing the configuration of each successive data group and for generating in response thereto an enabling pulse having duration in some predetermined relationship to the configuration of the incoming coded data group,

b. demultiplexing means electrically connected to said enabling pulse generating means and having at least one output terminal, for directing successive enabling pulses to the output terminals of said demultiplexing means in a predetermined sequence,

c. a light emitting diode connected to each output terminal of said demultiplexing means for generating light in relation to the duration of the enabling pulse, and

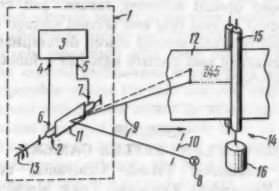
d. optical means for transferring the light generated by the light emitting diode to the photosensitive material.

3,988,743

DEVICE FOR RECORDING INFORMATION IN THE FORM OF SIGNS ON A LIGHT-SENSITIVE MATERIAL BY MEANS OF A LIGHT BEAM AND A LIGHT-BEAM OSCILLOGRAPH BUILT AROUND SAID DEVICE

Igor Viktorovich Mitin, Bratskaya ulitsa, 15, korpus 3, kv. 24, and Mstislav Semenovich Aralov, 2 Obydensky pereulok, 12, kv. 28, both of, Moscow, U.S.S.R.

Filed May 14, 1975, Ser. No. 577,791
Int. Cl.² G01D 9/42
U.S. Cl. 346—109 3 Claims



1. A device for recording information in the form of signs on a light-sensitive material by means of a light beam, comprising: a light source; a light beam produced by said light source; a tape transport mechanism; a light-sensitive material transported by said tape transport mechanism; a means for representing information in the form of signs, which means forms said light beam and projects it at said movable light-sensitive material in the form of signs; a reference frequency generator of said means for representing information in the form of signs; a pulse distributor of said means for representing information in the form of signs, whose input is connected to an output of said generator; a logical matrix of said means for representing information in the form of signs, having information inputs entered whereinto is decimal-coded information corresponding to a sign to be represented, said matrix also having readout inputs connected whereto are outputs of said pulse distributor; a sign information source connected to said information inputs; a quantized level circuit of said means for representing information in the form of signs, whose inputs are connected to outputs of said logical matrix; a galvanometer of said means for representing information in the form of signs, said galvanometer being electrically coupled to an output of said quantized level circuit; a mirror of said galvanometer whose rotation axis is roughly parallel to the direction of movement of said light-sensitive material and which reflects said light beam and shifts it along the surface of said light-sensitive material in the direction which is roughly perpendicular to the direction of movement of said light-sensitive material.

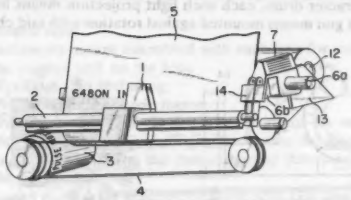
3,988,744

RECORDING DEVICE

Atsushi Noda, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed July 7, 1975, Ser. No. 593,515
Claims priority, application Japan, June 23, 1975, 50-077186; July 9, 1974, 49-080826[U]
Int. Cl.² G01D 15/24; B41J 15/00, 13/30; B65H 23/00
U.S. Cl. 346—136 15 Claims

1. A recording device comprising:
record means for writing information;
a guide for feeding a recording medium to said record means;
means for moving said guide in accordance with the configuration of said recording medium loaded; and
means movable with the movement of said guide for detecting the range over which said record means writes information on said recording medium.

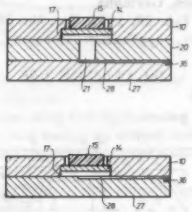


3,988,745

PRINTING INK SUPPLY DEVICE FOR INK JET PRINTER

Stig Bertil Sultan, Floda, Sweden, assignor to Aktiebolaget Original-Odhner, Goteborg, Sweden

Continuation of Ser. No. 403,941, Oct. 5, 1973, abandoned.
This application Feb. 24, 1975, Ser. No. 552,418
Int. Cl.² G01D 15/18
U.S. Cl. 346—140 R 8 Claims



1. A printing ink supply device for ink jet printers comprising: at least two plates located opposite to each other and interconnected, said first plate being provided with a recess having pumping means therein, said pumping means constituting a piezoelectric crystal and an operatively connected diaphragm, a pump chamber for said pumping means being constituted of a space formed between the pumping means and the second plate, a channel formed in said second plate by means of an elongated shallow groove in a surface facing said first plate together with an adjacent surface of said first plate, a capillary nozzle in one edge of said second plate, said space communicating with said capillary nozzle by means of said channel.

3,988,746

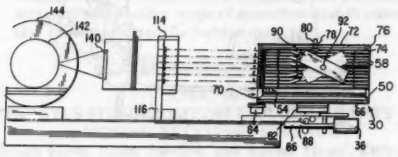
PHOTOCOMPOSING MACHINE

Allan Friedman, Skokie, Ill., assignor to Alphatype Corporation, Skokie, Ill.

Filed Nov. 15, 1974, Ser. No. 524,260
Int. Cl.² B41B 15/08
U.S. Cl. 354—7 10 Claims

1. A photocomposing machine comprising a plurality of charater drum means, each including a rotatable character drum bearing characters to be optically projected, each said character drum means also including drum traversing drive means to move said rotatable character drum in a direction substantially parallel to the axis of rotation thereof between a first and a second drum position, said characters being arranged in a plurality of substantially parallel equally spaced bands extending circumferentially around each of said character drums the distance between said first and second drum positions being equal to the distance between the centers of

two adjacent bands of characters and light projection means mounted within each of said rotating character drums for projecting characters along an optical path outwardly from the character drum, each such light projection means including light gun means mounted against rotation with said character drum and light gun positioning means to selectively move the light gun means to one of a plurality of light projection points, said light gun means being operative at each of said light projection points to illuminate characters in a different band of characters of said character drum.



3,988,747

AUTOMATIC FOCUSSING SYSTEM FOR PHOTOGRAPHIC CAMERAS

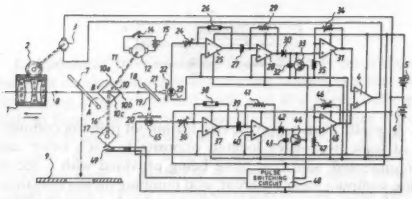
Peter Lermann, Narring; Stefan Vogt, and Alois Rieder, both of Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Feb. 28, 1975, Ser. No. 554,318

Claims priority, application Germany, Mar. 6, 1974, 2410681

Int. Cl.² G03B 7/08

U.S. Cl. 354—25 **13 Claims**



1. In a photographic camera having film located in a predetermined film plane, an objective for focussing light on said film, and moving means for moving said objective along a predetermined path between a first and second extreme position in response to a control signal, an automatic focussing arrangement, comprising, in combination, optical scanning means mounted for rotation about a fixed axis in said camera and positioned behind said objective for receiving light having passed through said objective and furnishing pulsed light corresponding thereto; rotating means coupled to said optical scanning means, for rotating said optical scanning means about said fixed axis; beam splitting means positioned behind said optical scanning means for receiving said pulsed light and furnishing a first and second pulsed light beam in response thereto; first photoelectric transducing means positioned in the path of said first pulsed light beam at a distance from the plane of said objective equal to the distance between said film plane and said plane of said objective decreased by a predetermined distance increment, for furnishing a first electrical signal in response to said first pulsed light beam; second photoelectric transducing means positioned in the path of said second pulsed light beam at a distance from said plane of said objective equal to said distance from said film plane to said plane of said objective increased by said predetermined distance increment, for furnishing second electrical signals in response to said second pulsed light beam; and circuit means connected to said first and second photoelectric transducing means and said moving means for furnishing said control signal to said moving means in response to said first and second electrical signals, said circuit means comprising a first and second differentiating circuit means connected to said first and second photoelectric transducing means, respectively, for differentiating said first and second electrical signals respectively and furnishing first and second differentiator output signals in response thereto, first and second storage means respectively connected to the output of said first and second differentiating circuit means for furnishing a first and second stored differentiator output signal respectively, discharge means connected to said first and second storage means and driven in synchronism with said rotating means for discharging said first and second storage means at least once during each rotation of said optical scanning means, and comparator means connected to said first and second storage means for comparing said first and second stored differentiator output signal and furnishing said control signal as a function of the difference therebetween.

3,988,748

SINGLE LENS REFLEX CAMERA

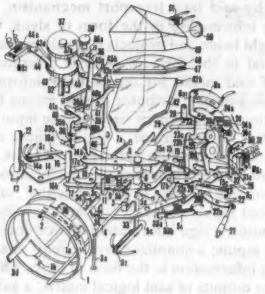
Yukio Iura, Yokosuka; Takashi Uchiyama, Yokohama; Masayoshi Yamamichi, Kawasaki; Yukio Mashimo, Tokyo, and Tetsuya Taguchi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 20, 1974, Ser. No. 534,886

Claims priority, application Japan, Dec. 26, 1973, 49-493252; Jan. 19, 1974, 49-498898

Int. Cl.² G03B 7/14

U.S. Cl. 354—29 **10 Claims**



1. A single lens reflex camera with an automatic exposure control system comprising in combination;

an objective lens with a lens aperture device,

photometer means responsive to a portion of the light entering through said objective lens and said lens aperture device and providing an output corresponding thereto,

exposure control parameter setting means, said setting means including manually operable means for setting a preselected shutter speed said setting means providing an output relating to the exposure control parameter setting;

a computer responsive both to the output of said photometer means and to the output of said exposure control parameter setting means to derive an exposure value in the form of an electrical signal having a certain magnitude,

memory means responsive to said computer for storing said exposure value related electrical signal of said computer,

a diaphragm control mechanism operatively associated with said lens aperture device to control the opening area of aperture of said lens aperture device in accordance with the magnitude of the electrical signal stored in said memory means,

a mirror mechanism with a mirror movable between viewing and non-viewing positions,

first and second drive means operatively connected to each other for operating said diaphragm control mechanism and said mirror mechanism respectively,

an actuating mechanism for actuating said first drive means to effect substantially simultaneous initiation of operation of said diaphragm and said mirror mechanism, and

a shutter mechanism automatically adjustable in accordance either with the preselected shutter speed set in said shutter speed setting means or with the magnitude of said electrical signal and actuable in automatic response to the movement of said second drive means to begin the operation of the shutter mechanism in timed relation to said diaphragm control mechanism and said mirror mechanism and wherein said lens aperture device has variable diaphragm blade means and diaphragm presetting means operatively associated with each other, while said diaphragm control mechanism is provided with automatically operable means for said variable diaphragm blade means and with control means for said diaphragm presetting means arranged to be movable from its normal position in response to an initiation of operation of said actuating mechanism, whereby the position of said diaphragm presetting means is adjusted by said control means in accordance with the magnitude of the electrical signal stored in said memory means, and said diaphragm blade means moved from its wide-open position in substantially simultaneous relation to the actuation of said diaphragm presetting means to define an aperture opening dependent upon the final position of said diaphragm presetting means and wherein diaphragm control mechanism including a variable resistor associated with said control means for providing varying resistance values as said control means is moved from its normal position, a comparator connected between said variable resistor and said memory means for comparing each of the signal levels proportional to the varying resistance values of said variable resistor with the level of the signal stored in said memory means, and arresting means connected to the output of said comparator upon coincidence of the level of a signal from said variable resistor with a reference level dependent upon the level of the signal stored in said memory means to arrest the moving control means at a point in the path of movement thereof which in turn determines the final position of said diaphragm presetting means and further including a detector connected between said memory means and said variable resistor to detect a difference between the level of the signal stored in said memory means and the level of a signal from said variable resistor when the control means is arrested by said arresting means, said difference being introduced to said shutter mechanism, whereby the preselected shutter speed is varied to make a correct exposure despite the fact that the actual aperture opening is deviated from the value corresponding to the exposure value derived by said computer.

3,988,749

DEVICE FOR AUTOMATIC DIAPHRAGM SETTING IN PHOTOGRAPHIC CAMERAS

Ralf Sture Frode, Pixbo, and Anders Engstrom, Lindome, both of Sweden, assignors to Fritz Victor Hasselblad, Goteborg, Sweden

Continuation of Ser. No. 395,127, Sept. 7, 1973, abandoned. This application Apr. 21, 1975, Ser. No. 569,688

Claims priority, application Sweden, Sept. 20, 1972, 12137/72; June 5, 1973, 7379279; June 26, 1973, 7389534; June 26, 1973, 7389542

Int. Cl.² G03B 7/08

U.S. Cl. 354—44 **21 Claims**

1. Apparatus for automatic diaphragm control of lenses which are detachably mounted on a camera, wherein each lens has attached thereto a shutter, a shutter speed ring for adjusting shutter speed, a diaphragm, a diaphragm ring for adjusting the opening of the diaphragm and means for removably attaching an accessory mount; the improvement comprising:

a control unit;

an accessory mount assembled with each lens for mounting the control unit on the lens;

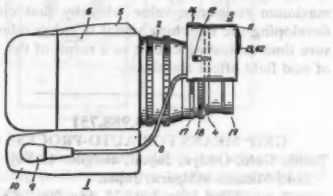
said control unit including;

a reversible D.C. electric motor;

a first diaphragm gear rotated by said motor for meshing with the diaphragm adjusting ring to rotate the diaphragm ring upon energizing the motor thereby determining the diaphragm opening;

a second diaphragm gear for meshing with said diaphragm ring;

aa potentiometer adjusted by said second diaphragm gear to a position having a resistance indicative of the diaphragm opening;



a light-sensing element having an output dependent upon light incident thereon;

circuit means connecting said light-sensing element and said potentiometer and having an output energizing said motor for balancing the potentiometer with the output of the light-sensing element in response to a change in light incident on said light-sensing element until the output of the circuit is zero;

film speed adjusting means for adjusting the position of said potentiometer relative to said second diaphragm gear independently of said shutter speed ring according to a selected film speed;

shutter speed gear means driven by said shutter speed adjusting ring, when said unit is mounted on the accessory mount for adjusting the position of said potentiometer relative to said second diaphragm gear according to a selected shutter speed.

3,988,750

EXPOSURE TIME INDICATING DEVICE FOR CAMERA SHUTTER

Takeo Saito, Chiba, Japan, assignor to Seiko Koki Kabushiki Kaisha, Japan

Continuation of Ser. No. 362,796, May 22, 1973, abandoned. This application May 13, 1975, Ser. No. 577,079

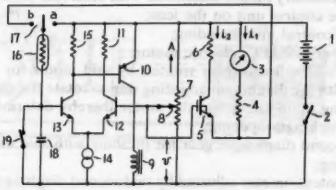
Claims priority, application Japan, May 22, 1972, 47-49861

Int. Cl.² G03B 7/08

U.S. Cl. 354—51 **4 Claims**

1. A device for controlling an electric camera shutter comprising, circuit means comprising a photo-responsive element and capacitor charged under the control of said photo-responsive element for developing a switching signal in dependence upon the brightness of an object being photographed, a switching circuit receiving the switching signal for controlling a camera shutter, time control means comprising a variable resistor varied in accordance with the value of an exposure factor other than brightness connected for varying a switching level of said switching circuit in accordance with said exposure factor, an exposure time indicating circuit for indicating visually the exposure time necessary for compensating for the brightness level and said exposure factor being taken into

consideration, a change-over switch for connecting the photoconductive element to said exposure time indicating circuit, said exposure time indicating circuit comprising a field effect transistor having a gate connected to said variable resistor and



having an input impedance substantially greater than said maximum resistance value whereby said circuit means for developing the switching signal is independent of said exposure time indicating circuit as a result of the high impedance of said field effect transistor.

3,988,751

GRIP MEANS FOR AUTO-PROCESS CAMERA

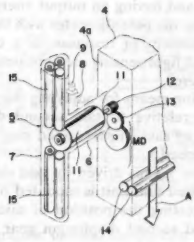
Toshio Goto, Omiya, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 2, 1975, Ser. No. 583,223

Claims priority, application Japan, June 6, 1974, 49-64783

Int. Cl.² G03B *29/00*

U.S. Cl. 354—82 **2 Claims**



1. In an auto-process camera including a main body having provided therein drive means for successively and automatically performing a series of actions including moving film, which is in the form of a sheet comprising at least a photosensitive layer, and has been exposed to image light at an exposure station, whereby said film constitutes a film unit for formation of an image by diffusion-transfer process, causing said film unit to pass between processing rolls, and directing said film unit after diffusion-transfer processing thereof to the exterior of said camera, the improvement comprising: hand grip means for the auto-process camera including a base tube portion having one end fixedly attached to a side of said main body of said camera at right angles thereto, motor means mounted within said base tube portion having an output shaft extending co-axially with said tube towards said body, gear means carried by said camera body constituting part of said drive means and engaging said motor output shaft, said grip means further comprising a grip tube portion which is integral with said base tube portion at the opposite end of said base tube portion from said camera body, and said grip tube portion defining a space for accommodation of a power supply means for actuation of said motor means, and being of a form permitting holding thereof in the hand.

3,988,752

MEANS FOR SUPPORTING SOURCES OF ARTIFICIAL LIGHT-IN PHOTOGRAPHIC APPARATUS HAVING EXPANSIBLE HOUSINGS

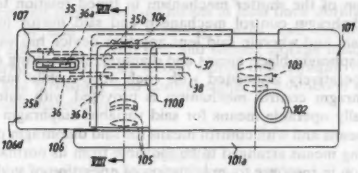
Alfred Winkler, Munich; Dieter Engelsmann, Unterhaching, and Karl Wagner, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Mar. 24, 1975, Ser. No. 561,323

Claims priority, application Germany, Mar. 26, 1974, 2414472; May 31, 1974, 2426436

Int. Cl.² G03B *17/04, 15/04*

U.S. Cl. 354—126 **14 Claims**



1. A camera comprising: a first housing section; a viewfinder in said first section having a pair of spaced-apart lens elements; a second housing section slidable on said first section between a closed position and an extended position and forming with said first section in said closed position a closed housing; a picture-taking lens on said first housing section; a socket on said second housing section positioned between said elements in said closed position and remote from said elements in said extended position, said socket being adapted to receive a flash source; a first pair of conductors fixed in said first housing section; and a second pair of conductors fixed in said second housing section and enclosed with said first pair in said housing in said closed position of said second section, the conductors of one of said pairs riding on and continuously making electrical contact with the conductors of the other pair.

3,988,753

STROBE ADAPTER FOR USE WITH PERCUSSIVE CAMERA

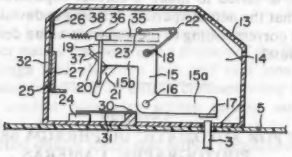
Yutaka Yano, Nishinomiya, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan, Kyoto, Japan

Filed Jan. 10, 1975, Ser. No. 540,250

Claims priority, application Japan, Jan. 18, 1974, 49-8766

Int. Cl.² G03B *19/02*

U.S. Cl. 354—141 **5 Claims**



1. A strobe adapter for adapting an electrically operated strobe for use with a camera having a striker that projects from the camera during a shutter release operation, said strobe adapter comprising

stationary contact means,

a lever having first and second ends,

means pivoting said lever intermediate said first and second ends,

first spring means connected to bias said lever whereby said lever has a dead center position, said spring means urging

said one end of said lever to contact said striker on one side of said dead center position and said other end of said lever beng urged toward said stationary contact means on the other side of said dead center position,

whereby when said striker urges said lever past its dead center position said other end of said lever is biased by said first spring means toward electrical contacting relationship with said stationary contact means for energizing said strobe, and

second spring means mounted to urge said other end of said lever away from said stationary contact means as soon as electrical contacting relationship is established between said other end of said lever and said stationary contact means to prevent continuous short circuiting of said strobe.

3,988,754

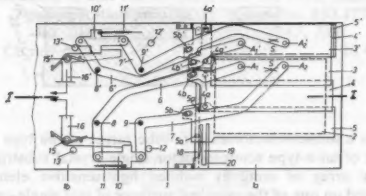
FAST OPERATING SLIT SHUTTER CAMERA

Waldemar T. Rentschler, and Franz W. R. Starp, both of Calmbach, Germany, assignors to Prontor-Werk, Alfred Gauthier GmbH, Wildbad, Germany

Continuation of Ser. No. 417,909, Nov. 21, 1973, abandoned. This application May 28, 1975, Ser. No. 581,530

Int. Cl.² G03B *9/36, 9/20*

U.S. Cl. 354—246 **5 Claims**



1. Slit shutter structure for a camera, comprising a shutter frame provided with an image window having a pair of opposed edges, a corresponding pair of opposed slit-shutter cover systems operating above the plane of the image window, each said system comprising relatively displaceable segments including a slit-forming segment forming the corresponding exposure slit edge and at least two cover segments associated therewith, said segments of each system being sequentially movable out of an overlapping position at a corresponding said opposed edge of the image window into an extended position across the image window, to shut said window, both said cover systems cooperating in such manner for movement during shutter operation that when one said cover system is moved into the overlapping position of its segments for shutter opening, the other cover system is moved in turn after a predetermined exposure time interval into the extended position of its segments for shutter closing, links on the shutter frame guidingly supporting the slit-forming segment of each cover system for movement of such slit-forming segment between such positions, and straight guides on the shutter frame guidingly supporting the cover segments associated with each said slit-forming segment for corresponding movement of such at least two cover segments between such positions.

3,988,755

SAFETY INSULATOR FOR DISCARDED CAMERA FILM AND BATTERY PACK

Arthur E. Vogel, Columbus, Ohio, assignor to S. Noel Melvin, Columbus, Ohio, a part Interest

Filed Sept. 25, 1975, Ser. No. 616,853

Int. Cl.² G03B *17/26*

U.S. Cl. 354—275 **13 Claims**

1. In combination with an automatic camera having a pocket for receiving a film pack,

a film pack comprising a housing having film and an electric battery therein, said battery having terminals which are exposed at associated openings in said housing, insulating means inwardly mounted in cooperation with the terminals for movement from a normal non-insulating position to an insulating position relative to the terminals, and means on the camera for engaging the insulating means as the film pack is withdrawn from the pocket to move it into insulating position relative to the terminals.

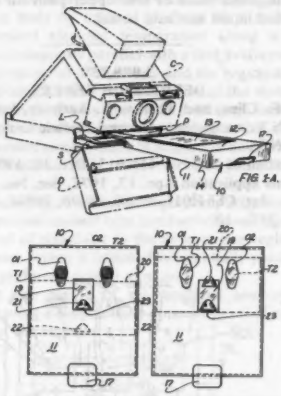


FIG 1-A.

3,988,756

APPARATUS FOR PROCESSING WEBS OF PHOTOGRAPHIC MATERIAL

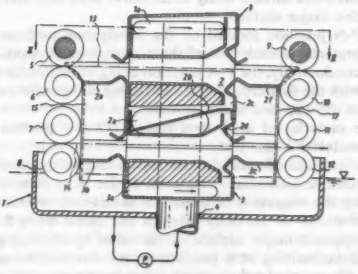
Richard Wick, Munich; Josef Pfeifer, and Helmut Schausberger, both of Unterhaching, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Jan. 28, 1975, Ser. No. 544,779

Claims priority, application Germany, Jan. 29, 1974, 2403984

Int. Cl.² G03D *3/08*

U.S. Cl. 354—319 **10 Claims**



1. In an apparatus for wet treatment of webs of photographic material, a combination comprising a vessel for a supply of liquid; a conditioning chamber disposed above said vessel and including vertically spaced upper and lower compartments respectively defining upper and lower paths for the movement of webs of photographic material through said chamber; means for advancing the webs along the respective paths; means for conveying liquid from said vessel into said chamber above and below said paths so that the webs which are being advanced through said chambers are contacted by liquid and the liquid is evacuated from said chamber by flow-

ing in and counter to the direction of movement of webs along said paths; and reflux means for returning evacuated liquid into said vessel, said reflux means including means for intercepting the liquid flowing in and counter to the direction of movement of webs along said upper path and passages adjacent to opposite sides of said upper path for conveying the intercepted liquid into said vessel.

3,988,757

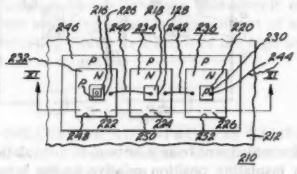
DEEP DIODE ZENERS

Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 411,013, Oct. 30, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 568,920

Int. Cl.² H01L *29/88, 29/90, 29/04, 7/00*

U.S. Cl. 357—13 **25 Claims**



1. A deep zener semiconductor diode comprising:

a body of single crystal semiconductor material having a first type conductivity, a predetermined level of resistivity, two major opposed surfaces which are, respectively, the top and bottom surfaces thereof, and a vertical axis which is substantially parallel with a first crystal axis of the material of the body;

at least one of the major surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (111), (110) and (100);

a lamellar structure of a plurality of integral alternate first and second regions of different and opposite type conductivity formed in situ in the body;

each region extending between, and terminating in, the opposed major surfaces and having opposed end surfaces, each end surface being coextensive with only one respective major surface;

a P-N junction formed by the contiguous surfaces of the material of each pair of abutting regions of opposite type conductivity, the P-N junction being substantially parallel with the first crystal axis and having end portions exposed at the opposed major surfaces;

the material of each first region being a portion of the material of the body.

the material of each second region consisting of recrystallized semiconductor material of the body formed in situ by the migration of a melt of metal-rich semiconductor material of the body through the entire body from one opposed major surface of the other by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the first preferred crystal axis and the vertical axis of the body and having a predetermined level of concentration of the metal of the melt distributed substantially uniformly throughout the entire region, the level of concentration of the metal being determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration, the metal comprising at least one dopant impurity material for inparting the type conductivity and a predetermined level of resistivity to the recrystallized material of the region;

a pair of mutually adjacent regions of opposite type conductivity comprising a zener diode;

a first electrical contact affixed to, and in an electrically conductive relationship with, the first region of the zener diode;

a second electrical contact affixed to, and in an electrically conductive relationship with, the second region of the zener diode, and

the predetermined level of resistivity of each of the first and second regions of the zener diode are so arranged that when the P-N junction therebetween is reversed bias to a critical voltage, the P-N junction breaks down by the tunneling of carriers across the depletion zone and results in a high current flow, the occurrence of the breakdown being dependent upon the level of resistivity of the regions of opposite type conductivity and the depletion zone widths which occurs during functioning of the zener diode.

3,988,758

SEMICONDUCTOR CAMERA-TUBE TARGET

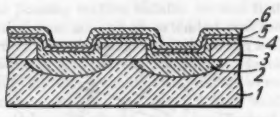
Tatsuo Fuji, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed July 1, 1975, Ser. No. 592,322

Claims priority, application Japan, July 10, 1974, 49-79437

Int. Cl.² H01L *27/14, 31/00*

U.S. Cl. 357—31 **1 Claim**



1. In a semiconductor camera-tube target of the type consisting of an n-type semiconductor single-crystal substrate, a mosaic array of mutually isolated light-sensitive elements arranged on one of the principal surfaces of said single-crystal substrate, an insulating layer formed on the substrate surface to passivate the substrate region between said isolated light-sensitive elements, and a semi-insulating layer formed to cover the surfaces of said light-sensitive elements and said insulating layer, the improvement which comprises: said semi-insulating layer comprising a first layer of C_eO_2 in direct contact with said light-sensitive elements and said insulating layer, a second layer of C_xPbO_{2+x} $(0<x<1)$ on said first layer, and a third layer of PbO on said second layer.

3,988,759

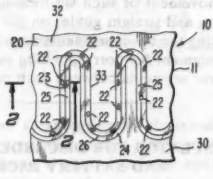
THERMALLY BALANCED PN JUNCTION

Richard Denning, Springfield, and Willem Gerard Einthoven, Belle Mead, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 26, 1974, Ser. No. 500,448

Int. Cl.² H01L *29/72, 29/06*

U.S. Cl. 357—36 **5 Claims**



1. A semiconductor device comprising;

a semiconductor wafer having upper and lower segments of one type conductivity and a layer of a semiconductor material having a second type conductivity, and forming a first PN junction with said upper segment,

a first portion of said layer having said second type conductivity and having a higher carrier concentration than the remainder of said layer, said first portion at least partially laterally surrounding a first plurality of regions located at empirically determined preselected positions which, but for said plurality of regions, would be positions of relatively high current density in said layer, said first plurality of regions being comparatively undoped regions of said layer extending through said first portion,

a second portion of said layer having said one type conductivity and being within said first portion and forming a second PN junction, therewith,

a first electrode formed on, and in electrical contact with, said lower segment of said wafer,

a second electrode overlying and making electrical contact to said second portion, and

a third electrode overlying and making electrical contact to a part of said first portion, positioned such that said first plurality of regions are in the electrical path from said third electrode to said second PN junction.

3,988,760

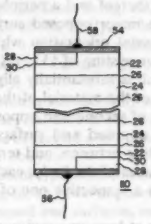
DEEP DIODE BILATERAL SEMICONDUCTOR SWITCH

Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 411,005, Oct. 30, 1973, abandoned. This application Feb. 26, 1975, Ser. No. 553,177

Int. Cl.² H01L *29/04, 29/74, 29/747, 7/00*

U.S. Cl. 357—39 **26 Claims**



1. In a bilateral semiconductor switch comprising a lamellar body of single crystal semiconductor material having two opposed major surfaces and embodying at least five regions of alternate and opposite type conductivity, a P-N junction formed by the contiguous surfaces of each pair of regions of opposite type conductivity, at least two regions of opposite type conductivity having coextensive surfaces comprising one of the two opposed major surfaces and the P-N junction formed therebetween having at least one end portion terminating in the major surface and another portion thereof disposed substantially parallel to the two major opposed surfaces, at least two other regions of opposite type conductivity having coextensive surfaces comprising the other of the major surfaces and the P-N junction formed therebetween having at least one end portion terminating in the other of the major surfaces and another portion thereof disposed substantially parallel to the two major opposed surfaces, a first electrical contact affixed to one major surface and in ohmic electrical contact with the at least two regions of opposite type conductivity and the end portion of the P-N junction exposed therein and a second electrical contact affixed to the other major surface and in ohmic electrical contact with the other at least two regions of opposite type conductivity and the end portion of the junction exposed therein, the improvement consisting of:

the body has a preferred crystallographic structure;

a side surface of the body has a preferred planar crystal orientation which is one selected from the group consisting of (100), (110) and (111);

at least one of the regions consists of recrystallized semiconductor material of the body formed in situ by the thermal migration of a melt of a metal-rich semiconductor material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with a first preferred crystal axis of the material of the body and the region and has a predetermined level of concentration of the metal of the melt as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration and the metal is distributed substantially uniformly throughout the entire region;

the metal including at least one dopant impurity material to impart a predetermined type conductivity and a predetermined level of resistivity to the at least one region;

the at least one region is oriented substantially parallel with a second preferred crystal axis, and

the at least one region of recrystallized semiconductor material having a substantially constant level of resistivity throughout the region.

3,988,761

FIELD-EFFECT TRANSISTOR AND METHOD OF MAKING THE SAME

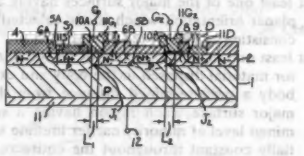
Masayoshi Kanazawa, Atsugi, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 113,447, Feb. 8, 1971, abandoned. This application Jan. 29, 1973, Ser. No. 327,513

Claims priority, application Japan, Feb. 6, 1970, 45-11028

Int. Cl.² H01L *27/02*

U.S. Cl. 357—41 **7 Claims**



1. A metal-insulator-semiconductor field-effect transistor comprising:

A. a semiconductor substrate of one conductivity type;

B. a semiconductor layer of the opposite conductivity type on one surface of said substrate;

C. first and second semiconductor regions of said one type diffused through said layer and into contact with said substrate;

D. a third semiconductor region of said opposite conductivity type diffused into said first region so that said first region forms a first shell-like narrow channel region between said third region and said layer, the edge of said shell-like narrow channel region being between the surface of said third region and the surface of said layer;

E. a fourth semiconductor region of said opposite conductivity type diffused into said second region and extending beyond the edge thereof and into contact with said layer between said first and second regions, said second region forming a second shell-like narrow channel region between said layer and the side of said fourth region away from said first region;

F. a drain region of said opposite conductivity type;

G. a first electrode connected to said drain region;

H. a second electrode connected to said third diffused region as a source electrode;

I. a layer of insulating material over said first channel region;

J. a first gate electrode on said insulating layer;

K. a second insulating layer over said second channel region; and

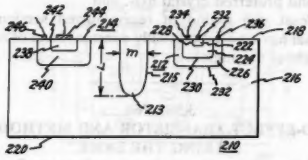
L. a second gate electrode on said second insulating layer.

3,988,762

MINORITY CARRIER ISOLATION BARRIERS FOR SEMICONDUCTOR DEVICES

Harvey E. Cline; Thomas R. Anthony, both of Schenectady; Richard A. Kokosa, Skaneateles, and E. Duane Wolley, Auburn, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 28, 1974, Ser. No. 474,033
Int. Cl.[2] H01L 27/04, 29/04, 29/167, 29/207
U.S. Cl. 357—48 29 Claims



1. A semiconductor device comprising

a body of semiconductor material having two major opposed surfaces forming respectively the top and bottom surfaces of the body, a peripheral side surface, and a first level of minority carrier lifetime;

at least one of the major surfaces having a predetermined planar orientation which is one selected from the group consisting of (100), (110) and (111);

at least one region consisting of recrystallized semiconductor material disposed in the body and extending into the body a predetermined distance from that at least one major surface, each region having a second predetermined level of minority carrier lifetime which is substantially constant throughout the entire region, the region dividing the body into two spaced regions, each having the first preferred level of minority carrier lifetime and in an abutting contact relationship with the recrystallized region having the second preferred level of minority carrier lifetime;

the at least one region being aligned substantially perpendicular to the surface of predetermined planar orientation;

the at least one region having one surface which is coextensive with the surface of predetermined planar orientation;

the recrystallized material of the at least one region being formed in situ by the migration of a metal, which includes at least one material for controlling the minority carrier lifetime of the semiconductor material, through the body a predetermined distance as a melt of metal-rich semiconductor material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient which had been established aligned substantially parallel with a preferred first crystal axis of the semiconductor material;

the concentration of the metal distributed throughout the at least one region is determined by the solid solubility of that metal in that semiconductor material at that predetermined elevated temperature of the migration, and

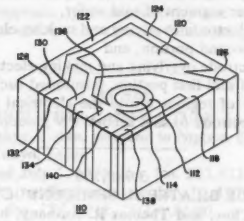
the concentration of the at least one material for controlling the minority carrier lifetime of semiconductor material in the metal imparting the predetermined second level of minority carrier lifetime to the region.

3,988,763

ISOLATION JUNCTIONS FOR SEMICONDUCTORS DEVICES

Manuel L. Torreno, Jr., Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 411,012, Oct. 30, 1973, abandoned.
This application Mar. 10, 1975, Ser. No. 556,726
Int. Cl.[2] H01L 27/04, 29/04, 7/00
U.S. Cl. 357—48 28 Claims



1. A semiconductor device comprising

a body of semiconductor material having a predetermined level of resistivity, a first type conductivity, two major opposed surfaces comprising, respectively, the top and bottom surfaces thereof and a peripheral side surface;

at least one of the major opposed surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (111), (110) and (100);

a vertical axis which is substantially aligned parallel with a first crystal axis of the material of the body;

at least one region of second and opposite type conductivity, and having opposed end surfaces, disposed in the body and extending between, and terminating in, the top and bottom surfaces of the body, each end surface being coextensive with a respective one of the opposed major surfaces;

the material of the at least one region consisting of recrystallized semiconductor material of the body formed in situ in the body by the migration of a melt of metal-rich semiconductor material of the body through the entire body, from one opposed major surface to the other, by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the first preferred crystal axis and the vertical axis of the body, and having a substantially uniform distribution of the metal throughout the entire region, the level of concentration of the metal being determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration, the metal comprising at least one dopant impurity material to impart the second type conductivity and level of resistivity to the region;

the at least one region dividing the body into at least two regions, each having first type conductivity, electrically isolated from one another;

each end surface of each at least one region being coextensive with only one respective major opposed surface of the body;

each of the at least one region of second type conductivity being oriented in a preferred direction which is substantially parallel with a second preferred crystal axis of the material of the body, and

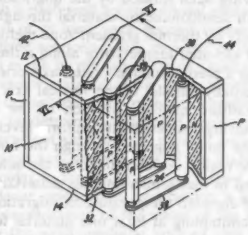
a plurality of P-N junctions, each P-N junction being formed by the contiguous surfaces of the materials of the mutually abutting regions of opposite type conductivity.

3,988,764

DEEP DIODE SOLID STATE INDUCTOR COIL

Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 411,000, Oct. 30, 1973, abandoned.
This application Apr. 23, 1975, Ser. No. 570,661
Int. Cl.² H01L 7/00, 27/02, 29/04, 23/32
U.S. Cl. 357—51 28 Claims



1. A solid state inductor coil comprising

a body of semiconductor material having a predetermined first type conductivity, a predetermined level of resistivity, and a preferred crystallographic structure;

two major opposed surfaces being, respectively, the top and bottom surfaces of the body, at least one of the major surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (111), (110) and (100);

a vertical axis which is substantially aligned parallel with a first preferred crystal axis of the material of the body;

an array of regions of second and opposite type conductivity disposed in the body;

each region of second type conductivity extending between, and terminating in, the two opposed major surfaces, and having two opposed end surfaces, each end surface being coextensive with a respective one of the major surfaces, and a longitudinal axis aligned substantially parallel with the vertical axis of the body;

the material of each second region consisting of recrystallized semiconductor material of the body formed in situ by the migration of a melt of metal-rich semiconductor material of the body through the entire body from one opposed major surface to the other by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the first preferred crystal axis and the vertical axis of the body and having a predetermined level of concentration of the metal of the melt distributed substantially uniformly throughout the entire region, the level of concentration of the metal being determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration, the metal comprising at least one dopant impurity material for imparting the type conductivity and a predetermined level of resistivity to the recrystallized material of the region;

each second region being a path for conducting electrical currents between the opposed major surfaces of the body;

a P-N junction formed by the contiguous surfaces of the material of each region and the abutting material of the body, a portion of the junction being exposed at the opposed major surfaces, and

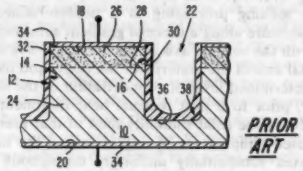
means for electrically connecting the array of regions into a series electrical circuit arrangement to function as an inductor coil.

3,988,765

MULTIPLE MESA SEMICONDUCTOR STRUCTURE

Adam Jan Pikor, Summit, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 8, 1975, Ser. No. 566,528
Int. Cl.² H01L 29/06, 23/30
U.S. Cl. 357—52 10 Claims



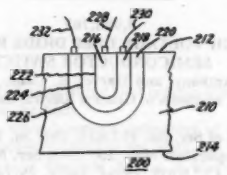
1. A structure for use in the manufacture of a semiconductor device comprising a semiconductor island, the semiconductor island comprising a single crystal semiconductor material, the island further comprising a small mesa located atop a large mesa, and a coating adjacent the island having thick portions thereof adjacent to the island in a corner space where the small mesa and the large mesa merge said thick portions being relatively thicker than portions of said coating located elsewhere.

3,988,766

MULTIPLE P-N JUNCTION FORMATION WITH AN ALLOY DROPLET

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 29, 1974, Ser. No. 464,801
Int. Cl.² H01L 29/06, 29/04, 29/167, 7/00
U.S. Cl. 357—60 30 Claims



1. A semiconductor device comprising:

a body of semiconductor material having a first predetermined type conductivity, a first predetermined level of resistivity and two major opposed surfaces which are, respectively, the top and bottom surfaces of the body;

at least one of the major opposed surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (111), (110) and (100);

the body having a preferred vertical axis which is substantially perpendicular to the surface of preferred planar orientation;

an integral structure of at least three regions of semiconductor material each suitably doped to have a predetermined level of resistivity and a predetermined type conductivity formed in situ in the body;

a first region of substantially uniform cross-sectional area and of a predetermined level of resistivity throughout the entire region and having a second predetermined type conductivity formed in the body, the first region extending into the body a predetermined distance from one of the two major surfaces of the body and having at least one end surface coextensive with the one major surface of the body from which it extends, the material of the first re-

gion consisting of recrystallized semiconductor material of the body formed in situ by the migration of a melt of a metal-rich semiconductor material of the body, wherein the metal includes at least two semiconductor doping impurity materials contained therein, the solid state diffusion coefficient of each impurity material in the semiconductor material of the first region, as well as the body, being different from one another, by thermal gradient zone melting processing at a predetermined elevated temperature along a thermal gradient substantially parallel with the vertical axis of the body and a first preferred crystal axis of the material of the body, and has an initial predetermined level of concentration of the metal of the melt, prior to a post thermal heat treatment, as determined by the solid solubility limit at that predetermined elevated temperature of migration and the metal is distributed substantially uniformly throughout the entire region, the type conductivity and level of resistivity being substantially determined by the doping material having the least rate of solid state diffusivity;

at least one second region of a third predetermined type conductivity formed in situ in the body by a post diffusion process following the formation of the first region and abutting the first region, the at least one second region extending into the body a predetermined distance from the same one major surface as the first region, the predetermined type of conductivity being determined by the semiconductor dopant impurity material of the first region having the a greater rate of solid state diffusivity than the first semiconductor dopant metal, the resistivity of the at least one second region being substantially the same throughout any given plane which is substantially parallel to the abutting surfaces of the two regions and having a decreasing level of resistivity with increasing distance from the first region in any plane which is substantially perpendicular to the abutting surfaces of the two regions, and

each first and second region having a preferred vertical axis substantially parallel with the vertical axis of the body.

3,988,767

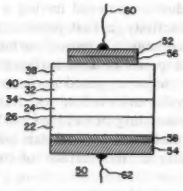
HIGH VOLTAGE DEEP DIODE POWER SEMICONDUCTOR SWITCH

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 411,019, Oct. 30, 1973, abandoned. This application Mar. 10, 1975, Ser. No. 556,709

Int. Cl.[2] H01L *29/04, 29/74, 29/747, 7/00*

U.S. Cl. 357—60 **16 Claims**



1. A semiconductor switch comprising

a body of semiconductor material having two major opposed surfaces forming respectively the top and bottom surfaces of the body, a predetermined level of resistivity, a predetermined type conductivity, a preferred crystal structure and a vertical axis substantially perpendicular to the major opposed surfaces;

at least one of the major surfaces having a predetermined crystal planar orientation;

at least one group of four planar regions of alternate and opposite type conductivity and a P-N junction formed by the abutting and contiguous surfaces of each pair of regions of opposite type conductivity disposed in the body and so arranged that the P-N junctions and planar regions are substantially perpendicular to, and terminate in, the major opposed surfaces of the body;

the material of at least three of the four planar regions consisting of recrystallized semiconductor material of the body;

the recrystallized material of the at least three planar regions having been formed by the migration of a melt of metal-rich semiconductor material through the material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient which has a predetermined crystal axis orientation which is substantially parallel to the vertical axis of the body;

the recrystallized material of each of the at least three regions having a substantially uniform level of concentration of the metal migrated through the body throughout the entire region as determined by the solid solubility of that metal in that semiconductor material at that predetermined elevated temperature of migration;

the metal containing at least one material for imparting a predetermined level of resistivity and a predetermined type conductivity to its respective planar region;

each of the first and third regions having the same type conductivity as that of the body;

each of the first and third regions having a different level of resistivity from each other;

each of the second and fourth regions having a second and opposite type conductivity than the first and second regions and a different level of resistivity from each other;

each of the three regions of recrystallized semiconductor material having a preferred crystal direction;

a first electrical contact affixed in an electrical conductive relationship to the first region of the group, and

a second electrical contact affixed in an electrical conductive relationship to the fourth region of the group.

3,988,768

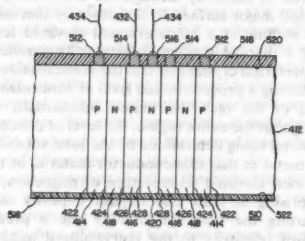
DEEP DIODE SILICON CONTROLLED RECTIFIER

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 411,004, Oct. 30, 1973, abandoned. This application Feb. 28, 1975, Ser. No. 554,172

Int. Cl.[2] H01L *29/74, 29/04, 7/00*

U.S. Cl. 357—60 **26 Claims**



1. A semiconductor device comprising a body of semiconductor material having a predetermined first type conductivity, a predetermined level of resistivity, two major opposed surfaces comprising the top and bottom surfaces thereof and a lamellar structure of at least four planar regions of alternate and opposite type conductivity formed in situ in the body and extending between, and terminating in, the opposed major surfaces;

the body having an axis substantially perpendicular to the two major opposed surfaces and substantially parallel with a first preferred crystal axis of the material of the of the body;

at least one of the major opposed surfaces having a preferred crystal planar orientation which is one selected from the group consisting of (111), (110) and (100);

a plurality of first planar regions of first regions of first type conductivity comprising at least two of the planar regions;

a plurality of second regions of second type conductivity comprising at least two of the planar regions;

each of the first and second regions being aligned substantially with a preferred second crystal axis of the body;

the material of at least each second region consisting of recrystallized semiconductor material of the body which is formed in situ by the migration of a melt of a metal-rich semiconductor material of the body, which comprises at least one dopant material, by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the first preferred crystal axis and the axis of the body substantially perpendicular to the major surface having the preferred crystal planar orientation, and having a predetermined level of concentration of the metal of the melt as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration and the metal is distributed substantially uniformly throughout the entire region to provide a substantially uniform level of resistivity throughout the entire region and to impart the predetermined type conductivity thereto and having a substantially uniform cross-section throughout the entire region;

each of the first and second regions having opposed major surfaces;

one of the major surfaces of one of the first regions being coextensive with one of the opposed major surfaces of the body;

a first P-N junction formed by the contiguous surfaces of the other opposed major surface of the first region and the mutually adjacent major opposed surface of the adjacent second region;

one of the major surfaces of one of the second regions being coextensive with the other of the opposed major surfaces of the body;

a second P-N junction formed by the contiguous surfaces of the other of the major opposed surfaces of the second region and one of the adjacent major opposed surfaces of the adjacent first region;

a plurality of third P-N junctions, each third P-N junction being formed by a remaining pair of contiguous major opposed surfaces of each pair of mutually adjacent first and second regions of opposite type conductivity;

a first electrical contact affixed to, and in an electrical conductive relationship with, a selected surface area of the region which has a surface coextensive with one of the two major opposed surfaces of the body;

a second electrical contact affixed to, and in an electrical conductive relationship with, a selected surface area of the other region having a surface coextensive with the other of the two major opposed end surfaces of the body, and

gating means for biasing at least one of the first, the second and the plurality of third P-N junctions to at least switch the semiconductor device into an "on" condition.

3,988,769

HIGH VOLTAGE DIODES

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 411,007, Oct. 30, 1973, abandoned.
This application Mar. 10, 1975, Ser. No. 556,728
Int. Cl.² H01L *29/00, 29/04, 23/32, 7/00*
U.S. Cl. 357—60 **12 Claims**

1. A high voltage semiconductor diode comprising:

a body of semiconductor material having

a predetermined first type conductivity and a predetermined level of resistivity;

two major opposed end surfaces;

a pair of opposed major surfaces, at least one of the surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (111), (110) and (100);

a preferred vertical axis which is perpendicular to the surface having the preferred planar crystal orientation and substantially parallel with a first crystal axis;

a lamellar structure of alternate first and second planar regions of different and opposite type conductivity formed in situ in the body substantially perpendicular to the surface having the preferred planar crystal orientation and so arranged as to provide a plurality of integral diodes connected in a series electrical circuit,

each diode having a first and a second region of opposite type conductivity in abutting contact relationship with each other,

a first region of one diode having a surface area coextensive with one of the opposed end surfaces of the body,

a second region of another diode having a surface area coextensive with the other of the opposed end surfaces of the body,

the material of each of the first regions consisting of the material of the body,

each of the second regions consisting of recrystallized semiconductor material of the body, the recrystallized semiconductor material having a lower defect and dislocation density than the semiconductor material of the body, and having a predetermined level of concentration of a dopant impurity material therein to impart a predetermined type conductivity to the second region opposite to that of the first region,

each of the second regions being oriented substantially parallel with a second preferred crystal axis of the material of the body;

each of the second regions being formed in situ in the body by the migration of a melt of metal-rich semiconductor material of the body through the entire body from one opposed major surface to the other, by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the first preferred crystal axis and the vertical axis of the body which produces the recrystallized semiconductor material of each second region having the predetermined level of concentration of the dopant impurity material therein as determined by the solid solubility limit of the metal of the melt, comprising the dopant impurity material, in that semiconductor material of the body at that predetermined elevated temperature of migration and the metal is distributed substantially uniformly throughout the entire second region;

each of the second regions having a substantially constant level of impurity material concentration and a substantially constant thickness throughout the region;

a plurality of first P-N junctions, each first P-N junction being formed by the contiguous surfaces of each pair of first and second regions of opposite type conductivity of each diode;

a plurality of second P-N junctions, each second P-N junction being formed by the contiguous surfaces of the abutting regions of opposite type conductivity of mutually adjacent integral diodes;

each of the first and second P-N junctions being substantially free of defects and being substantially perpendicular to the surface of preferred planar crystal orientation;

a first electrical contact affixed to, and in an electrically conductive relationship with, one of the opposed end surfaces of the body;

a second electrical contact affixed to, and in an electrically conductive relationship with, the other of the opposed end surfaces of the body, and

means for electrically shunting each second P-N junction.

3,988,770

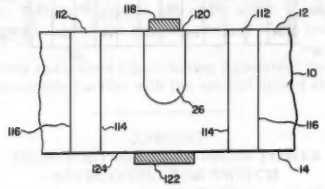
DEEP FINGER DIODES

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 411,002, Dec. 14, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 559,262

Int. Cl.² H01L *29/04, 23/48*

U.S. Cl. 357—60 **26 Claims**



1. A semiconductor device comprising:

a body of semiconductor material having a selected resistivity, a selected first type conductivity and two major opposed surfaces comprising respectively top and bottom surfaces of the body;

at least one of the major opposed surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (111), (110) and (100);

the body having a vertical axis which is substantially perpendicular to the surface of preferred planar orientation and substantially parallel with a first preferred crystal axis of the material of the body;

at least one first region consisting of recrystallized material of the body disposed in the body, each first region extending from one of the major surfaces into the body less than the thickness of the body, and having an end surface coextensive with the one major surface of the body from which it extends;

each first region having a vertical axis substantially aligned with the vertical axis of the body and the first preferred crystal axis of the material of the body;

the recrystallized material of each first region is formed in situ by the migration of a melt of metal-rich semiconductor material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the first preferred crystal axis and the vertical axis of the body and has a predetermined level of concentration of the metal of the melt therein determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration, the metal being distributed substantially uniformly throughout the entire region and comprising a dopant impurity material to impart a second selected resistivity and a second and opposite type conductivity thereto, and

a first P-N junction formed by the contiguous surfaces of the material of each first region and the material of the body.

3,988,771

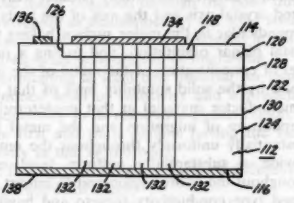
SPATIAL CONTROL OF LIFETIME IN SEMICONDUCTOR DEVICE

Surinder Krishna, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 28, 1974, Ser. No. 474,035

Int. Cl.² H01L *29/167, 29/00, 29/04*

U.S. Cl. 357—64 **24 Claims**



1. A semiconductor device comprising:

a body of single crystal semiconductor material having a predetermined type conductivity, a predetermined level of resistivity, a predetermined first level of lifetime, two major opposed surfaces comprising, respectively, the top and bottom surfaces thereof, and a vertical axis aligned substantially parallel with a preferrd first crystal axis of the material of the body;

at least the top surface having a preferred planar crystal orientation which is one selected from the group consisting of (111) and (100);

at least two abutting regions of alternate and opposite type conductivity formed in the body, one of the regions having a surface area coextensive with the top surface of the body, and another one of the regions having a surface area coextensive with the bottom surface of the body;

a P–N junction formed by the coextensive surfaces of the material of each pair of abutting regions of opposite type conductivity;

at least a portion of one of the P–N junctions being parallel with the two opposed major surfaces;

at least one region of recrystallized semiconductor material formed in situ in the body by the migration of a melt of metal-rich semiconductor material of each of the regions through which the melt is migrated by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient aligned substantially parallel with the preferred first crystal axis and the vertical axis of the body and having a predetermined level of concentration of the metal of the melt as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration, the metal being distributed substantially uniformly throughout the entire region, and the metal includes at least one deep level impurity material therein to impart a predetermined second level of lifetime to the region of recrystallized material and to provide recombination centers for free carriers generated within the material of the body, and

each region of recrystallized semiconductor material has at least one end surface which is coextensive with one of the two major opposed surfaces and extends into the body

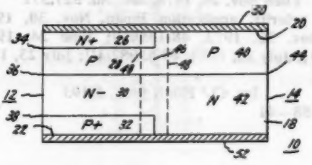
from that surface a predetermined distance to transverse an entire region and at least a portion of a second region and intersecting that portion of at least one P–N junction which is formed between the two regions and is parallel with the opposed major surfaces.

3,988,772

CURRENT ISOLATION MEANS FOR INTEGRATED POWER DEVICES

Surinder Krishna, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 28, 1974, Ser. No. 474,034
Int. Cl.² H01L 29/167, 29/00, 27/02, 29/04
U.S. Cl. 357—64 44 Claims



1. An integrated semiconductor power device comprising:

a body of semiconductor material having two major opposed surfaces which are, respectively, the top and bottom surfaces thereof, a predetermined type conductivity, a vertical axis which is aligned substantially parallel with a first preferred axis of the material of the body, and a first predetermined carrier lifetime;

at least one of the two major opposed surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (100), (110) and (111);

at least two mutually adjacent semiconductor devices formed in the body and in abutting contact with one another;

each device including at least two regions of alternate and opposite type conductivity;

a P-N junction formed by the contiguous surfaces of the material of each abutting pair of regions of opposite type conductivity in each device;

a portion of at least one P-N junction in each of the devices is aligned parallel with the two opposed major surfaces of the body;

a first region of recrystallized semiconductor material disposed in the body, extending entirely through the body, and terminating in, the two opposed major surfaces of the body, the first region having a vertical axis which is aligned substantially parallel with the first preferred axis of the material of the body and the vertical axis of the body, and a second predetermined carrier lifetime, and the first region includes a predetermined portion of the material of each of the mutually adjacent devices in abutting contact with each other;

the first region being oriented in the body along a preferred wire direction which is aligned substantially parallel with a second preferred axis of the material of the body;

a first array of columnar regions of recrystallized semiconductor material disposed in the body and so arranged as to extend entirely through a predetermined portion of one of the devices of the body from one opposed major surface to the other, each columnar region having a longitudinal axis aligned substantially parallel with each of the other longitudinal axes and with the first preferred crystal axis of the body and a third predetermined carrier lifetime;

a second array of columnar regions of recrystallized semiconductor material disposed in the body and so arranged as to extend entirely through a predetermined portion of the other one of the devices of the body from one opposed major surface to the other, each columnar region having a longitudinal axis aligned substantially parallel with each of the other longitudinal axes and with the first preferred crystal axis of the body and a fourth predetermined carrier lifetime, and

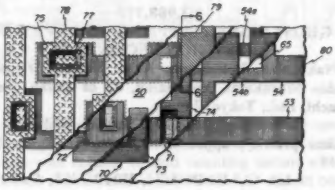
each first region and columnar region of recrystallized semiconductor material is formed in situ in the body by the migration of a respective melt of metal-rich semiconductor material of the region of the body through which it is migrated by a thermal gradient zone melting process at a predetermined elevated temperature along a thermal gradient established substantially parallel with the first crystal axis of the material of the body and has a predetermined level of concentration of the metal of the melt, as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration, the metal being distributed substantially uniformly throughout the entire region and including at least one deep level impurity material suitable for imparting the predetermined carrier lifetime thereto.

3,988,773

SELF-REGISTERED SURFACE CHARGE RECEIVE AND REGENERATION DEVICES AND METHODS

William E. Engeler, Scotia, and Jerome J. Tiemann, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 84,665, Oct. 28, 1970. This application Dec. 23, 1974, Ser. No. 535,589
Int. Cl.² H01L 27/10, 29/78
U.S. Cl. 357—24 4 Claims



4. Semiconductor surface charge storage and transfer apparatus comprising

a semiconductor substrate of one conductivity type,

means for forming a plurality of serially arranged charge storage regions in said substrate,

means for transferring charge along said serially arranged storage regions,

a source of charge in said substrate adjacent a storage region of said plurality,

means for controlling the transfer of charge from said source of charge into said one storage region.

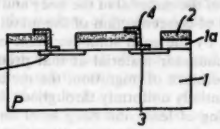
said means including a charge storage and transfer channel between said source of charge and said one storage region including a first portion into which a predetermined constant level of charge is injected and a second portion into which a level of charge alterable in accordance with a binary signal is injected.

3,988,774

PROCESS FOR PRODUCING A PHOTODIODE SENSITIVE TO INFRARED RADIATION

Gerard David Cohen-Solal, Paris, and Alain Gilles Lussereau, Saint-Michel-sur-Orge, both of France, assignors to Societe Anonyme de Telecommunications, France

Filed Apr. 28, 1975, Ser. No. 572,225
Claims priority, application France, Aug. 6, 1974, 74.27282
Int. Cl.² H01L 31/00, 21/36
U.S. Cl. 357—30 6 Claims



1. A process for producing a photodiode responsive to infrared radiation, which comprises the steps of depositing a thin layer over a p- or n- substrate of semiconductor material, said thin layer being of an electrically insulating material having a coefficient of expansion, a crystal lattice and a composition close to that of said semiconductor material, and the compositions of said semiconductor and said thin layer being the same or closely similar in proportions, depositing a dielectric protective layer over said thin layer, thermally treating the resulting product to bring about diffusion between said thin layer and said substrate, forming openings in said dielectric layer and said thin layer by planar technique, forming doped areas of opposite conductivity to the substrate through said openings to create a p-n junction and metallizing a part of the insulating material with electrically conducting metal.

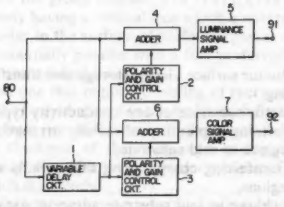
6. A photodiode responsive to infrared radiation produced by the process of claim 1.

3,988,775

GHOST SIGNAL SUPPRESSING DEVICE FOR TELEVISION RECEIVER SET

Isao Nakagawa, Yokohama; Akira Shibata, Fujisawa, and Toshio Murakami, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sept. 15, 1975, Ser. No. 613,501
Claims priority, application Japan, Sept. 19, 1974, 49-107149
Int. Cl.² H04N 5/21; H04B 1/68, 1/10
U.S. Cl. 358—36 3 Claims



1. A device for suppressing a ghost signal contained in a television signal comprising:

delay means for providing a variable time delay for delaying an input signal;

a first means for controlling the amplitude of a signal delayed by said delay means and subtracting the delayed signal from the input signal;

a second means for controlling the amplitude of said delayed signal and subtracting said delayed signal from said input signal;

means for deriving a luminance signal out of an output terminal of said first means; and

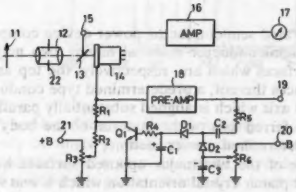
means for deriving a color signal out of an output terminal of said second means.

3,988,776

SYSTEM FOR CONTROLLING EXCESSIVE INCIDENT LIGHT IN COLOR TELEVISION CAMERAS

Takashi Shinozaki, Yokohama; Seigo Kokufukata, Tokyo; Shintaro Nakagaki, Yokohama, and Tetsushi Satoh, Kamakura, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Nov. 26, 1974, Ser. No. 527,371
Claims priority, application Japan, Nov. 30, 1973, 48-35066; Nov. 30, 1973, 48-135067; June 24, 1974, 49-737131[U]; July 22, 1974, 49-85982[U]; July 23, 1974, 49-86828[U]
Int. Cl.² H04N 9/07, 5/193
U.S. Cl. 358—41 7 Claims



1. In a color television camera having a camera tube for picking up an image of incident light reflected from an object and for producing output signals responsive to the image of the object, the levels of said output signals varying in accordance with the incident light quantity when a constant target voltage is used, said camera comprising a system for disposal of excessive incident light quantity comprising:

means for impressing a voltage on a target of the camera tube;

control means responsive to the incident light quantity for automatically controlling said voltage impressing means to hold constant the target voltage when the incident light quantity is less than a first predetermined light quantity and to reduce the target voltage below said constant voltage to hold constant the level of the output signal of the camera tube when the incident light quantity is greater than said first predetermined light quantity;

detection means for detecting when the incident light quantity on the camera tube exceeds a second predetermined quantity, which is greater than the first predetermined light quantity to such an extent that the resulting deterioration of the picked-up picture exceeds a practical allowable limit despite the operation of the control means;

indication means responsive to the output of said detection means for indicating to an operator of the camera that the incident light quantity to the camera tube exceeds the second predetermined light quantity; and

an iris mechanism controlled by the operator and located in the optical path followed by the incident light reaching the camera tube, said iris mechanism being operated only when the indicator means indicates that the incident light quantity exceeds the second predetermined light quantity, said iris operation reducing the incident light quantity to a value which is less than said second predetermined light quantity.

3,988,777

COLOR PICTURE TUBE

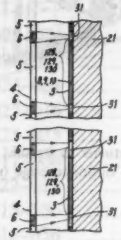
Kakuichiro Hosokoshi, Neyagawa; Hiroto Nakamura, and Akira Sato, both of Takatsuki, all of Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Filed Mar. 11, 1975, Ser. No. 557,372

Claims priority, application Japan, Mar. 13, 1974, 49-29376

Int. Cl.² H04N 9/20; G03B 41/00; H01J 29/80, 29/10

U.S. Cl. 358—65 5 Claims



1. A color picture tube comprising:

a vacuum enclosure having a face panel,

a shadow mask having a number of oblong slots which are arranged in lengthwise rows as well as in widthwise alignments, the shadow mask being disposed in said vacuum enclosure with a specified gap from the inner wall of said face panel,

a picture screen formed on said inner wall of said face panel and having a number of oblong phosphor strips forming phosphor strip sets, each consisting of specified kinds of phosphor strips disposed side by side, each of said oblong slots facing each set of said phosphor strips, and

an electron-gun assembly including three electron-gun units disposed in line in said enclosure in a direction so that three electron beams emitted therefrom shoot on the picture screen after crossing each other at a spot on said shadow mask, and

characterized in that:

in all parts of the picture screen and the shadow mask, the widths of the phosphor strips are smaller than those of the slots,

in central part of the picture screen and the shadow mask, the length of the phosphor strips

is longer than the length of the slots, but is shorter than that of beam spots landing on the picture screen,

and

in outskirt corner parts of the picture screen and of the shadow mask, the length of said phosphor strips

is shorter than the length of the slots.

3,988,778

SYSTEM FOR RANDOM, TIME ACCURATE ACCESS TO RECORDED MATERIAL

Richard M. Swenson, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 10, 1975, Ser. No. 548,648

Int. Cl.² G11B 15/18

U.S. Cl. 360—72 10 Claims

1. A system that automatically retrieves previously identified portions of a recorded tape on selection by an operator, comprising:

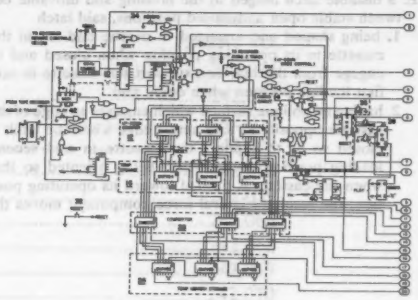
tape recording means for recording information on a recording tape;

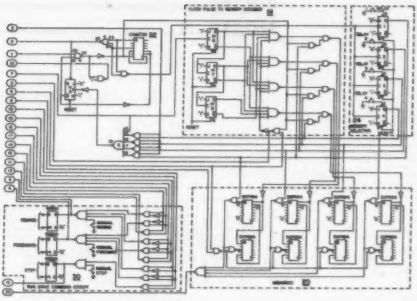
means for recording electronic time marks on said tape at uniformly spaced increments of time while simultaneously recording information on said tape;

means for counting said time marks such that said count increases as the tape passes said counting means in one direction and decreases as it passes in the other direction;

means for storing selected counts of said counting means as they occur such that the count identifying the location of selected portions of the recorded material is stored;

electronic means for comparing a selected stored count with the count of said counting means; and





means for controlling said tape recording means in response to said comparison such that said tape is automatically positioned with respect to said counting means whereat said selected stored count equals the count of said counting means;

whereby a preselected portion of recorded information is automatically retrived on request by the operator.

3,988,779

EDGE-LOADING TAPE DECK OR HOLDER

Michael D. Leis, Framingham; Thomas C. Stockebrand, Boxboro, and Wilfred Y. Benson, Natick, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 397,318, Sept. 14, 1973, abandoned.

This application June 30, 1976, Ser. No. 591,604

Int. Cl.² G11B 23/04, 15/32; B65H 17/02

U.S. Cl. 360—96 9 Claims

1. An edge-loading cassette holder comprising:

A. a housing

B. a magnetic head within the housing,

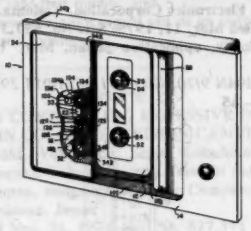
C. a pair of drive spindles projecting into the housing,

D. means within the housing for resiliently retaining and positioning the active edge of the cassette relative to the head so that the cassette is swingable between

1. an operating position wherein it is entirely within the housing with the spindles projecting into the cassette, and
2. first and second loading positions wherein it is free of the spindles and projecting partially out of the housing, and

E. a bistable latch hinged to the housing and movable between stable open and closed positions, said latch

1. being shaped and arranged to overlie and retain the cassette in its operating position when closed and to engage from the rear and support the cassette in said first loading position when open, and
2. having an oblique surface which engages an edge of the cassette opposite its said active edge when the latch is closed so as to support the cassette in said second loading position, said surface being oriented so that when the cassette is pushed toward its operating position, the resultant lateral force component moves the latch only partway toward its open position to permit the cassette to seat in its said operating position where-



upon the latch returns to its said closed position and engages over said opposite edge of the cassette.

DESIGN PATENTS

GRANTED OCTOBER 26, 1976

ERRATA

For CLASS	See PATENT NO.
025–074	242,034
025–074	242,035
025–061	242,037
025–016	242,038
025–035	242,058
011–008	242,059
022–019	242,066
015–056	242,068
015–056	242,069
015–127	242,070
015–149	242,071
015–122	242,079
015–112	242,084

DESIGN PATENTS

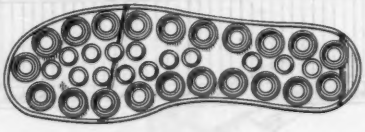
GRANTED OCTOBER 26, 1976

ERRATA

DESIGNS

OCTOBER 26, 1976

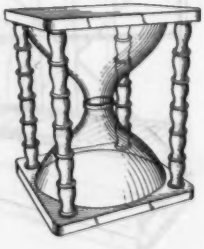
241,988
ATHLETIC SHOE SOLE
Joseph P. Famolare, Jr., Florence, Italy, assignor to Famolare, Inc., New York, N.Y.
Filed Feb. 3, 1975, Ser. No. 546,345
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320



241,989
NECKTIE FOR AN OPEN-COLLAR SHIRT
H. Heath Webb, 216 Applewood Lane, Virginia Beach, Va. 23452
Filed Oct. 16, 1973, Ser. No. 406,825
Term of patent 14 years
Int. Cl. D2—*05*
U.S. Cl. D2—354

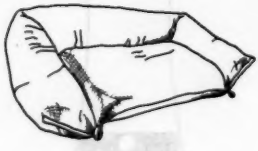
241,990
FRET ENGRAVED GLOVE
Jesus Monroy Milan, Mexico City, Mexico, assignor to Productos Adex, S.A. de C.V.
Filed Aug. 13, 1974, Ser. No. 497,347
Term of patent 14 years
Int. Cl. D2—*06*
U.S. Cl. D2—373

241,991
INVERTIBLE STOOL OR SIMILAR ARTICLE
Richard Lewis, 464 Green Bay Road, Winnetka, Ill. 60093
Filed Jan. 8, 1975, Ser. No. 539,331
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—3

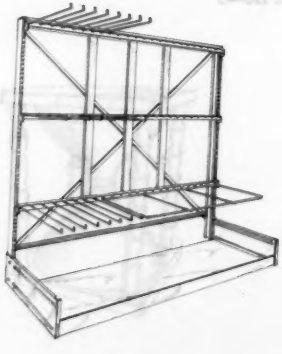


241,992
AUDIO-VISUAL INSTRUCTION CARRELL
Albert W. Riswold, 124 Palmetto St., Jesup, Ga. 31545
Filed Mar. 28, 1974, Ser. No. 455,633
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—25

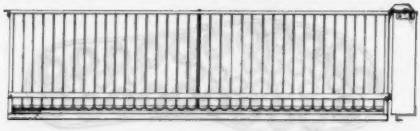
241,993
COUCH
Robert J. Marks, 210 Johnson Ferry Road, Atlanta, Ga. 30328
Filed Mar. 4, 1975, Ser. No. 555,258
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



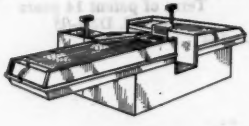
241,994
DISPLAY STAND OR SIMILAR ARTICLE
Philip C. Shaner, Robert O. Hughes, William J. Pomerson, and Roger Hansen, Albert Lea, Minn., assignors to Litton Business Systems, Inc., Beverly Hills, Calif.
Filed Jan. 18, 1974, Ser. No. 434,487
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—85

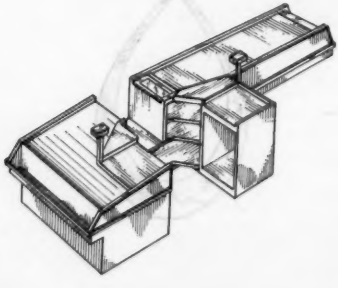


241,995
COMBINED CIGARETTE DISPLAY AND VENDING RACK
Peter Mihos, 278 Spring St., Brockton, Mass. 02401
Filed Aug. 18, 1975, Ser. No. 605,623
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—113

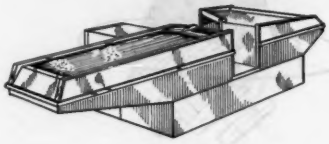


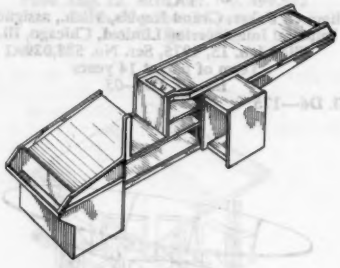
241,996
CHECKOUT COUNTER OR SIMILAR ARTICLE
Jay Granville Fenwick, Albert Lea, Minn., assignor to Litton Business Systems, Inc., Beverly Hills, Calif.
Filed Oct. 1, 1975, Ser. No. 618,496
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—143



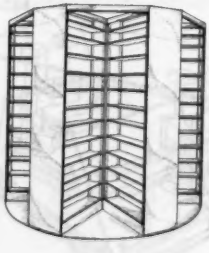


241,997
CHECKOUT COUNTER OR SIMILAR ARTICLE
Jay Granville Fenwick, Albert Lea, Minn., assignor to Litton Business Systems, Inc., Beverly Hills, Calif.
Filed Oct. 2, 1975, Ser. No. 618,840
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—143





241,998
ROTATABLE STORAGE UNIT OR SIMILAR ARTICLE
Mervin Rohrer, Anoka, and Carl Wettlaufer, Albert Lea, Minn., assignors to Litton Business Systems, Inc.
Filed Dec. 11, 1973, Ser. No. 423,667
Term of patent 3½ years
Int. Cl. D6—*04*
U.S. Cl. D6—148



241,999
TABLE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
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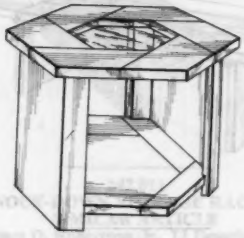
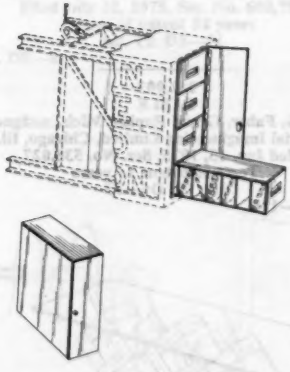
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—149



242,000
STORAGE COMPARTMENT FOR USE WITHIN SIGNS
Donald W. Brown, 444 E. Amity, P.O. Box 7682, Boise, Idaho 83707
Filed Aug. 8, 1974, Ser. No. 492,292
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



242,001
TABLE
Roland P. Carter, Lynchburg, Va., assignor to The Lane Company, Inc., Altavista, Va.
Filed Dec. 4, 1974, Ser. No. 529,595
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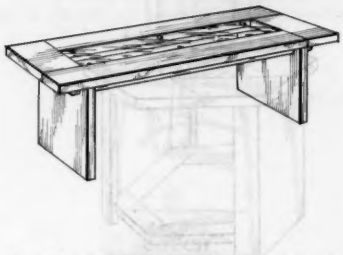
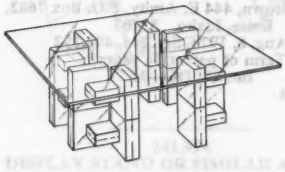
U.S. Cl. D6—175



242,002
TABLE
William G. Faber, Grand Rapids, Mich., assignor to Imperial Imagineering Limited, Chicago, Ill.
Filed Jan. 15, 1975, Ser. No. 538,025
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



242,003
TABLE
William G. Faber, Grand Rapids, Mich., assignor to Imperial Imagineering Limited, Chicago, Ill.
Filed Jan. 15, 1975, Ser. No. 538,027
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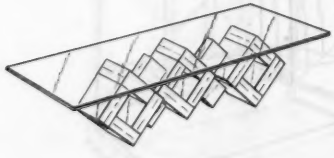
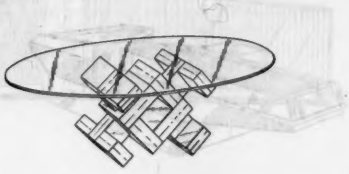
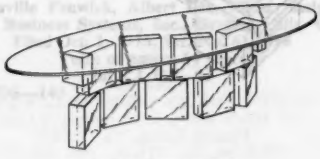
Int. Cl. D6—*03*
U.S. Cl. D6—175



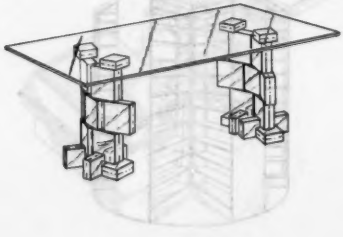
242,004
TABLE
William G. Faber, Grand Rapids, Mich., assignor to Imperial Imagineering Limited, Chicago, Ill.
Filed Jan. 15, 1975, Ser. No. 538,028
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



242,005
TABLE
William G. Faber, Grand Rapids, Mich., assignor to Imperial Imagineering Limited, Chicago, Ill.
Filed Jan. 15, 1975, Ser. No. 538,029
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175

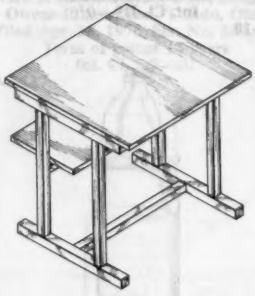


242,006
TABLE
William G. Faber, Grand Rapids, Mich., assignor to Imperial Imagineering Limited, Chicago, Ill.
Filed Jan. 15, 1975, Ser. No. 538,030
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175

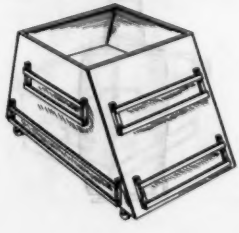


242,007
SNACK TABLE
Marshall Bedol, Shaker Heights, Ohio, assignor to Marshallan Products, Inc., Cleveland, Ohio
Filed June 12, 1975, Ser. No. 586,240
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

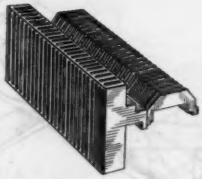
242,008
TYPING STAND
John P. Salsgiver, 29 Ethan Allen Drive, Acton, Mass. 01720
Filed Aug. 22, 1974, Ser. No. 499,592
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179



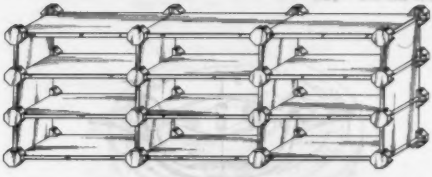
242,009
MOBILE BOOK RACK AND STORAGE BOX COMBINATION
Vernon M. Hemingway, 913 Norby St., Carson, Calif. 90746
Filed July 18, 1975, Ser. No. 597,065
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—184



242,010
RACK FOR CASSETTES
Gerhard Habelt, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Mar. 19, 1975, Ser. No. 559,819
Claims priority, application Switzerland Sept. 27, 1974
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—188



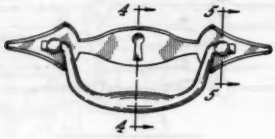
242,011
KNOCK-DOWN STORAGE RACK OR SIMILAR ARTICLE
James D. Robertson, Jr., 12 Douglass St., Cambridge, Mass. 02139
Filed Nov. 25, 1974, Ser. No. 527,086
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—189



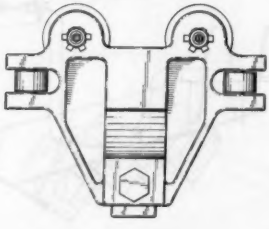
242,012
ICEDRILL
Reino Kotajarvi, 99600 Sodankyla 3, Finland
Filed July 31, 1975, Ser. No. 600,792
Term of patent 14 years
Int. Cl. D8—*01*
U.S. Cl. D8—8

242,013
SUCTION CUP HOLDING DEVICE FOR PAINT CANS
John L. Cussigh, 8116 Regis Way, Los Angeles, Calif. 90045
Filed May 19, 1975, Ser. No. 578,522
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—71

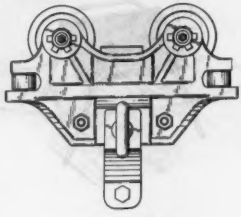
242,014
PULL
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Sept. 19, 1975, Ser. No. 615,063
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—158



242,015
TROLLEY
Francis X. Busche, 25807 Circle Drive, Southfield, Mich. 48075, and John F. Miller, 1915 Echo Hills Drive, Howell, Mich. 48843
Filed Nov. 20, 1975, Ser. No. 633,811
Term of patent 14 years
Int. Cl. D12—*04*
U.S. Cl. D8—217



242,016
TROLLEY
Francis X. Busche, 25807 Circle Drive, Southfield, Mich. 48075, and John F. Miller, 1915 Echo Hills Drive, Howell, Mich. 48843
Filed Nov. 20, 1975, Ser. No. 633,812
Term of patent 14 years
Int. Cl. D12—*04*
U.S. Cl. D8—217



242,017
BOTTLE
Raymond G. Reynolds, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed June 17, 1974, Ser. No. 479,816
Term of patent 14 years
The term of this patent subsequent to Oct. 26, 1990, has been disclaimed
Int. Cl. D9—*01*
U.S. Cl. D9—10

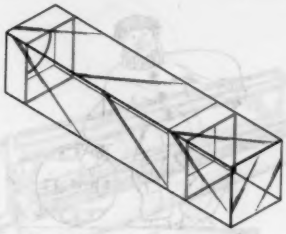
242,018
COMBINED BOTTLE AND CLIP THEREFOR
Frank V. Gargione, 807 White Horse Pike, Egg Harbor, N.J. 08215
Filed Oct. 3, 1974, Ser. No. 511,911
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—10

242,019
BOTTLE OR SIMILAR ARTICLE
Barry J. Stoddard, 129 Jackson St., South River, N.J. 08882
Continuation-in-part of abandoned design application Ser. No. 376,352, July 5, 1973. This application May 1, 1975, Ser. No. 573,441
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—32

242,020
JAR
Edward J. Kretz, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Apr. 18, 1975, Ser. No. 569,482
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—157

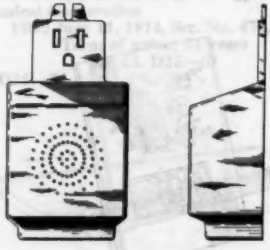
242,021
TISSUE DISPENSER
Donald J. Shanklin, Granada Hills, Calif., assignor to Orion Industries, Inc., Torrance, Calif.
Filed Nov. 29, 1974, Ser. No. 528,422
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—224

242,022
PACKAGING CONTAINER
Robert M. Bish, Houston, Tex., assignor to Mrs. Congetta Bish, Houston, Tex.
Filed Feb. 25, 1975, Ser. No. 552,735
Term of patent 14 years
Int. Cl. D9—*05*
U.S. Cl. D9—249



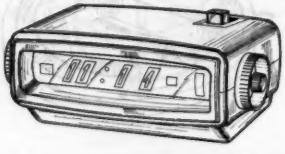
242,023
CONTAINER LID
William C. Hunt, 815 Houser Way N., Renton, Wash. 98055
Filed Sept. 23, 1974, Ser. No. 508,050
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—254

242,024
HOUSING FOR ALARMS AND THE LIKE
James P. Wang and David I. Wolsk, Lexington, Ky., assignors to Wolsk Associates, Ltd., Lexington, Ky.
Filed Sept. 29, 1975, Ser. No. 617,691
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106



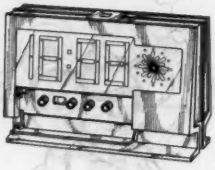
242,025
CLOCK OR SIMILAR ARTICLE
James O. O'Brien, 2101 Hawk Lane, Rolling Meadows, Ill. 60008
Filed Mar. 28, 1975, Ser. No. 562,972
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—8

242,026
DIGITAL CLOCK
Koji Terada, Kawasaki, Japan, assignor to Tamura Electric Works, Ltd., Tokyo, Japan
Filed Dec. 5, 1974, Ser. No. 529,602
Claims priority, application Japan June 17, 1974
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15

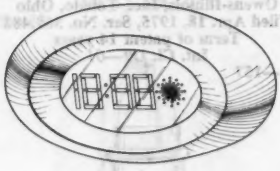


242,027
CLOCK
Koji Terada, Kawasaki, Japan, assignor to Tamura Electric Works, Ltd., Tokyo, Japan
Filed Dec. 5, 1974, Ser. No. 529,603
Claims priority, application Japan Sept. 25, 1974
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15

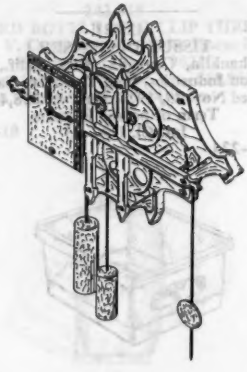
242,028
DIGITAL CLOCK
Koji Terada, Kawasaki, Japan, assignor to Tamura Electric Works, Ltd., Tokyo, Japan
Filed Dec. 5, 1974, Ser. No. 529,604
Claims priority, application Japan June 8, 1974
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



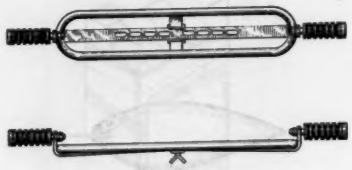
242,029
DIGITAL CLOCK
Koji Terada, Kawasaki, Japan, assignor to Tamura Electric Works, Ltd., Tokyo, Japan
Filed Dec. 5, 1974, Ser. No. 529,605
Claims priority, application Japan June 8, 1974
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



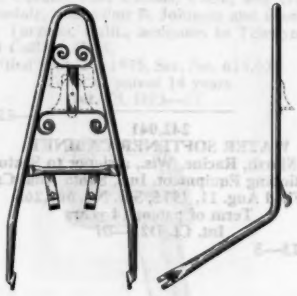
242,030
CLOCK
Alvin L. Thompson, 4241 Bellaire, Wichita, Kans. 67218, and Curtis L. Luce, 4169V in Marina 108, Marina Del Rey, Calif. 90291
Filed June 30, 1975, Ser. No. 591,626
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—20



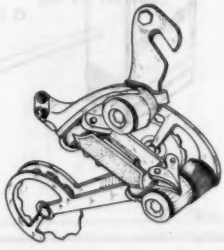
242,031
HIGHWAY BAR FOR MOTORCYCLES
Harold L. Hartlaub, Hanover, Pa., assignor to A & H Cycle Accessory Company, McSherrystown, Pa.
Filed Oct. 16, 1975, Ser. No. 622,942
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114



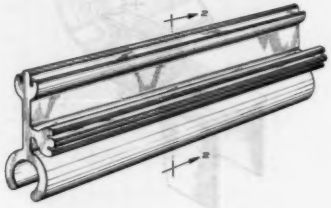
242,032
SISSY BAR FOR MOTORCYCLES
Harold L. Hartlaub, Hanover, Pa., assignor to A & H Cycle Accessory Company, McSherrystown, Pa.
Filed Oct. 16, 1975, Ser. No. 622,941
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—119



242,033
DERAILLEUR
Tullio Campagnolo, 168 Corso Padova, 36100 Vicenza, Italy
Filed Mar. 30, 1973, Ser. No. 346,478
Claims priority, application Italy Oct. 3, 1972
Term of patent 7 years
Int. Cl. D12—*11*
U.S. Cl. D12—124

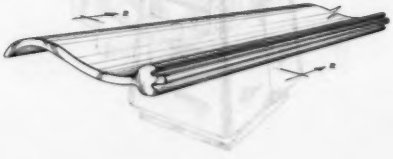


242,034
PILING FOR THE CONSTRUCTION OF RETAINING WALLS OR THE LIKE
Ronald H. Drawsky, Walnut Creek, and David C. Thomas, Moraga, Calif., assignors to Kaiser Aluminum & Chemical Corporation
Filed June 11, 1974, Ser. No. 478,191
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74

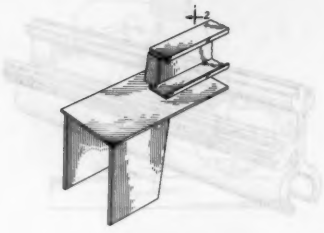


242,035
PILING FOR THE CONSTRUCTION OF RETAINING WALLS OR THE LIKE
Ronald H. Drawsky, Walnut Creek, and David C. Thomas, Moraga, Calif., assignors to Kaiser Aluminum & Chemical Corporation
Filed June 11, 1974, Ser. No. 478,193
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74

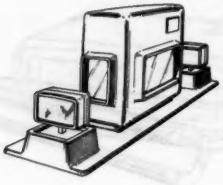
242,036
PILING FOR THE CONSTRUCTION OF RETAINING WALLS OR THE LIKE
Ronald H. Drawsky, Walnut Creek, and David C. Thomas, Moraga, Calif., assignors to Kaiser Aluminum & Chemical Corporation
Filed June 11, 1974, Ser. No. 478,194
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



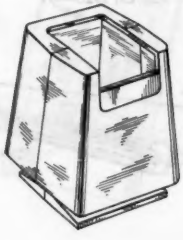
242,037
POST CAP AND TRUSS TIE UNIT
George E. France, 901 W. James St., Geneva, Ill. 60134
Continuation-in-part of abandoned design application Ser. No. 249,760, May 2, 1972. This application July 10, 1974, Ser. No. 487,129
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—61



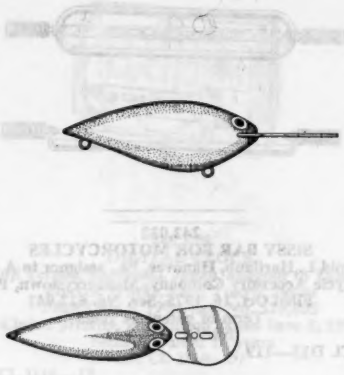
242,038
PHOTOGRAPHIC SERVICES DRIVE-IN KIOSK
Glen A. Gardner, Castro Valley, Calif., assignor to Phototron Co., Rialto, Calif.
Filed Aug. 5, 1974, Ser. No. 494,750
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—16



242,039
PENCIL WELL
William Macowski, Caldwell, N.J., assignor to Ketcham & McDougall, Inc., Roseland, N.J.
Filed Mar. 6, 1975, Ser. No. 555,980
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—85

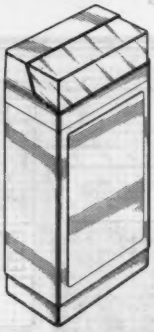


242,040
FISHING LURE
William D. Storm, Norman, Okla., assignor to Storm Plastics, Inc., Norman, Okla.
Filed July 29, 1974, Ser. No. 492,617
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28

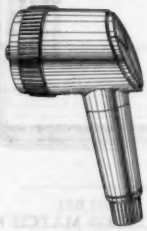


242,041
WATER SOFTENER CABINET
William J. Marsh, Racine, Wis., assignor to Saxton Water Conditioning Equipment, Inc., Santa Ana, Calif.
Filed Aug. 11, 1975, Ser. No. 603,265
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—3

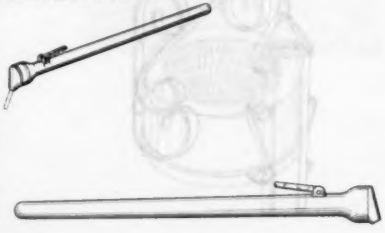
242,042
WATER SOFTENER CABINET
William J. Marsh, Racine, Wis., assignor to Saxton Water Conditioning Equipment, Inc., Santa Ana, Calif.
Filed Aug. 11, 1975, Ser. No. 603,365
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—3



242,043
WATER FILTER
Thomas E. Corder, Fort Collins, Colo., and Gerald W. Lee, Glendale, and Allan B. Johnson and Frederick G. Mackay, Tarzana, Calif., assignors to Teledyne Water Pik, Fort Collins, Colo.
Filed Sept. 23, 1975, Ser. No. 616,039
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4



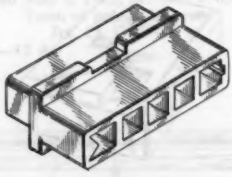
242,044
APPLICATOR FOR TOOTH SEALANT
Alan J. Perfect, Allentown, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.
Filed Oct. 7, 1975, Ser. No. 620,434
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—1 D



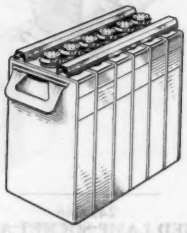
242,045
LAMP SOCKET
Rob Roy Glass, Rome City, Ind., assignor to Lyall Electric, Inc., Albion, Ind.
Filed Oct. 22, 1975, Ser. No. 624,944
Term of patent 14 years
Int. Cl. D26—*99*
U.S. Cl. D26—1 G

242,046
COMBINED LAMP SOCKET AND PLUG
Rob Roy Glass, Rome City, Ind., assignor to Lyall Electric, Inc., Albion, Ind.
Filed Oct. 22, 1975, Ser. No. 624,945
Term of patent 14 years
Int. Cl. D26—*99*
U.S. Cl. D26—1 G

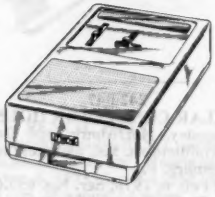
242,047
MODULAR CONNECTOR HOUSING
Wilmer Lee Sheesley, Harrisburg, and Dean Roosevelt Hooper, Jr., Middletown, Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Filed Feb. 6, 1976, Ser. No. 655,642
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A

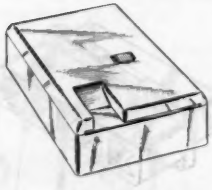


242,048
COMBINED ACCUMULATOR BATTERY AND CONNECTOR COVER THEREFOR
Per Enar Lennart Frode, Oskarshamn, Sweden, assignor
Claims priority, application Sweden Mar. 20, 1975
to Nife Jungner AB, Oskarshamn, Sweden
Filed Sept. 9, 1975, Ser. No. 611,766
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D26—4

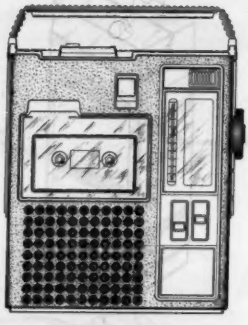


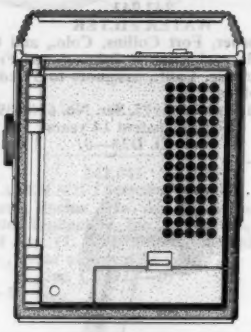
242,049
PORTABLE DICTATION MACHINE OR THE LIKE
Eliot F. Noyes, New Canaan, Conn., assignor to
International Business Machines Corporation
Filed Mar. 17, 1975, Ser. No. 559,300
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 B





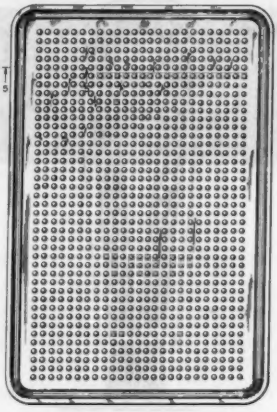
242,050
COMBINATION RADIO AND CASSETTE RECORDER
Tomoji Okada, Tokyo, Japan, assignor to General
Electric Company, Syracuse, N.Y.
Filed May 30, 1975, Ser. No. 582,394
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 B



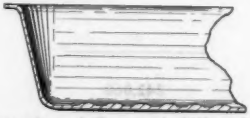


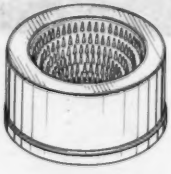
242,051
WALL MOUNTED MATCH HOLDER
Linda C. Brown, Box 219, Clovis, N. Mex. 88101
Filed Mar. 30, 1976, Ser. No. 671,999
Term of patent 14 years
Int. Cl. D27—*99*
U.S. Cl. D27—32

242,052
CHICK FEEDER TRAY
William Van Ness, Upper Saddle River, N.J.
(11 Railroad Place, Belleville, N.J. 07109)
Filed Sept. 20, 1974, Ser. No. 507,691
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—16

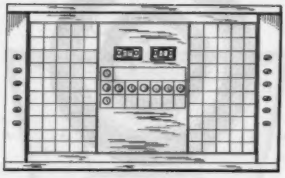


242,053
NAP RENEWER FOR TENNIS BALL
Gex B. Coons, 5641 Colfax Ave., North Hollywood, Calif. 91601, and Carl L. Seeley, La Crescenta, Calif.; said Seeley assignor to said Coons
Filed Feb. 10, 1975, Ser. No. 548,441
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST

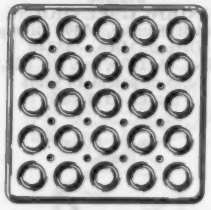




242,054
GAME BOARD
James D. Bissell, Lake View Drive, Lake Hills, Rte. 1, Pfafftown, N.C. 27040
Filed May 17, 1974, Ser. No. 471,024
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

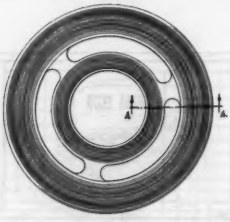


242,055
MOLDED ONE PIECE BINGO GAME BOARD
Dwight C. Brown, 5712 N. 20th St., Arlington, Va. 22205
Filed Feb. 7, 1975, Ser. No. 547,785
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



242,056
CARD HOLDER
Isabel M. Card, 900 E. Siskiyou Blvd., Apt. C–1, and Irene W. Sanner, 2230 E. Main St., both of Medford, Oreg. 97501
Filed May 9, 1975, Ser. No. 576,166
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—13 A

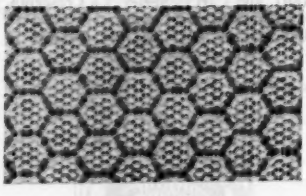
242,057
AERIAL TOY
George C. Sun, Cherry Hill, N.J., assignor to The Amsun Corporation, Cherry Hill, N.J.
Filed July 25, 1975, Ser. No. 599,322
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 HH



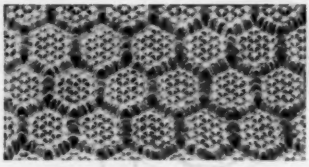
242,058
WINDOW GREENHOUSE
Donald R. Hunter, 20490 Olympia, Detroit, Mich. 48240
Filed Oct. 16, 1975, Ser. No. 622,797
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D25—35

242,059
NECKLACE MADE OF WOVEN BEADS
Pauline E. Putnam, % Bead-Weavers, 526 Duncan St., San Francisco, Calif. 94131
Filed Mar. 27, 1975, Ser. No. 562,677
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—8

242,060
LACE FABRIC
Martha M. Johns, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.
Filed Feb. 13, 1974, Ser. No. 442,159
Term of patent 14 years
Int. Cl. D5—*02*
U.S. Cl. D47—6 B

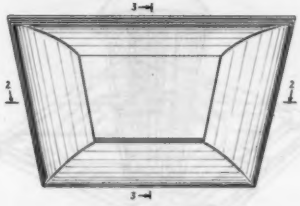


242,061
LACE FABRIC
Franklin James Evans, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.
Filed May 31, 1974, Ser. No. 476,130
Term of patent 14 years
Int. Cl. D5—*02*
U.S. Cl. D47—6 B

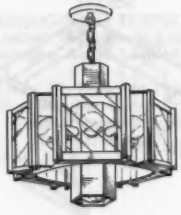


242,062
CANDLESTICK
James E. Vickers, 3005 Garfield St., Tallahassee, Fla. 32301
Filed Nov. 12, 1975, Ser. No. 631,311
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2

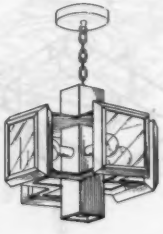
242,063
FRAMING MODULE FOR LIGHTING FOR CEILINGS OR SIMILAR ARTICLE
Stuart H. Manley, White Bear Lake, Minn., and William H. P. Tacke, Wyoming, Mich., assignors to Conwed Corporation, St. Paul, Minn.
Continuation of design applications Ser. No. 386,168 and Ser. No. 386,169, both Aug. 6, 1973, both now abandoned. This application Apr. 28, 1975, Ser. No. 572,131
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—7 D



242,064
LIGHT FIXTURE
Fredrick P. Glassman, 9170 La Alba, Whittier, Calif. 90605
Filed Sept. 15, 1975, Ser. No. 613,163
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—23 R

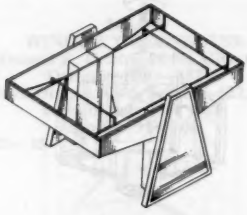


242,065
LIGHT FIXTURE
Fredrick P. Glassman, 9170 La Alba, Whittier, Calif. 90605
Filed Sept. 15, 1975, Ser. No. 613,164
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—23 R

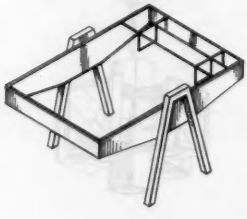


242,066
COMBINED DECORATIVE LIGHT AND ELECTRONIC BUG KILLER
Martin A. Kahn, 1111 Blalock, Apt. 194, Houston, Tex. 77055
Filed Apr. 25, 1974, Ser. No. 463,906
Term of patent 14 years
Int. Cl. D22—*06*; D26—*03*
U.S. Cl. D48—24 R

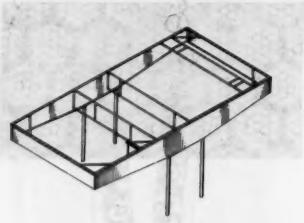
242,067
SUPPORT FOR CAR CLEANING EQUIPMENT OR THE LIKE
Ivan J. Barber, Mississauga, Ontario, Canada, assignor to The Allen Group Inc., Huntington Station, Long Island, N.Y.
Filed June 12, 1975, Ser. No. 586,292
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—56



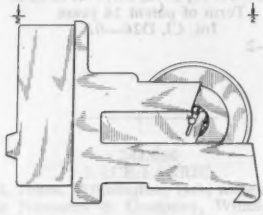
242,068
SUPPORT FOR CAR CLEANING EQUIPMENT AND THE LIKE
Ivan J. Barber, Mississauga, Ontario, Canada, assignor to The Allen Group Inc., Huntington Station, Long Island, N.Y.
Filed June 12, 1975, Ser. No. 586,295
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—56



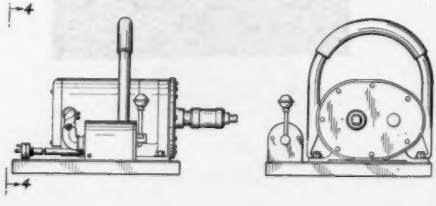
242,069
SUPPORT FOR CAR CLEANING EQUIPMENT AND THE LIKE
Ivan J. Barber, Mississauga, Ontario, Canada, assignor to The Allen Group Inc., Huntington Station, Long Island, N.Y.
Filed June 12, 1975, Ser. No. 586,296
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—56



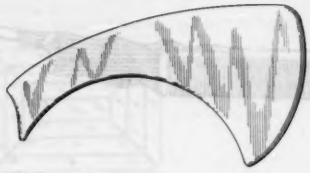
242,070
COMPACT SLITTING MECHANISM
Elvin A. Mastriani, Roseland, and Robert E. Mastriani, Long Valley, N.J., assignors to Arrow Converting Equipment, Inc., Fairfield, N.J.
Filed June 3, 1975, Ser. No. 583,151
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—127



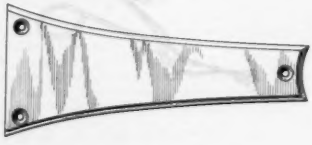
242,071
MACHINE FOR ROTATING REEL TYPE MOWERS TO LAP IN BLADES OR THE LIKE
Robert S. Jones, 5105 Hancock Road, Jacksonville, Fla. 32205
Filed Aug. 11, 1975, Ser. No. 603,274
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—149



242,072
PICK GUARD FOR GUITAR OR SIMILAR ARTICLE
Richard L. Schneider, Kalamazoo, Mich., assignor to Norlin Music, Inc., Lincolnwood, Ill.
Filed May 12, 1975, Ser. No. 576,271
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A

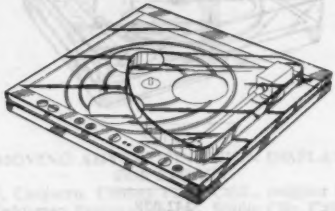


242,073
TRUSS ROD COVER FOR GUITAR OR SIMILAR ARTICLE
Michael Kasha, Tallahassee, Fla., and Richard L. Schneider, Kalamazoo, Mich., assignors to Norlin Music, Inc., Lincolnwood, Ill.
Filed May 12, 1975, Ser. No. 576,319
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A

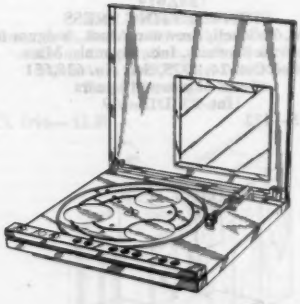


242,074
GUITAR OR SIMILAR ARTICLE
Michael Kasha, Tallahassee, Fla., and Stanley E. Rendell and Richard L. Schneider, Kalamazoo, Mich., assignors to Norlin Music, Inc., Lincolnwood, Ill.
Filed May 12, 1975, Ser. No. 576,327
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1 A

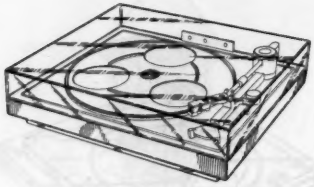
242,075
PHONOGRAPH TURNTABLE
David Barry Linford Brickwood, London, England, assignor to Strathearn Audio Limited, Belfast, Northern Ireland
Filed Nov. 27, 1974, Ser. No. 527,633
Claims priority, application Great Britain June 6, 1974
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4 R



242,076
PHONOGRAPH TURNTABLE
David Barry Linford Brickwood, London, England, assignor to Strathearn Audio Limited, Belfast, Northern Ireland
Filed Nov. 27, 1974, Ser. No. 527,634
Claims priority, application Great Britain June 6, 1974
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4 R

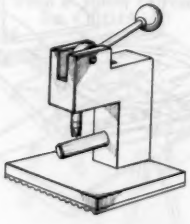


242,077
PHONOGRAPH TURNTABLE
David Barry Linford Brickwood, London, England, assignor to Strathearn Audio Limited, Belfast, Northern Ireland
Filed Nov. 27, 1974, Ser. No. 527,635
Claims priority, application Great Britain June 6, 1974
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4



242,078
RADIO
Howard S. Teller, Jr., Mundelein, Ill., assignor to Chicago Display Company, Melrose Park, Ill.
Filed Feb. 12, 1975, Ser. No. 549,290
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

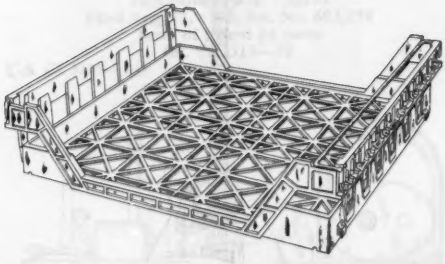
242,079
STONE SETTING PRESS
Paul M. Twichell, Brewster, Mass., assignor to Guertin Brothers, Inc., Hyannis, Mass.
Filed Oct. 24, 1975, Ser. No. 625,651
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—122



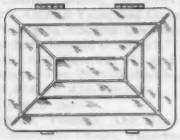
242,080
COMB
Joseph A. Dutler, 9262 20th Ave. NW., Seattle, Wash. 98107
Filed Jan. 24, 1975, Ser. No. 543,805
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—8

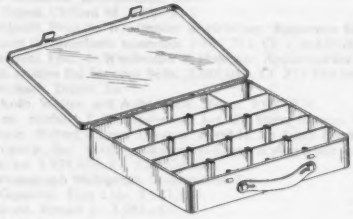
242,081
EYELASH CURLER
Marguerite Piper, 311 Apolena, Balboa Island, Calif. 92662
Filed July 22, 1974, Ser. No. 490,562
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 A

242,082
STACKING CONTAINER OR THE LIKE
James C. Carroll, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed July 29, 1974, Ser. No. 492,833
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—1 R

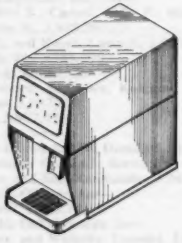


242,083
TACKLE BOX OR THE LIKE
Robert A. Jean, Jacksonville, Fla., assignor to J. W. Lures, Inc., Jacksonville, Fla.
Filed June 2, 1975, Ser. No. 583,415
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—1 R





242,084
DRINK DISPENSER
George C. Moreton, Winston-Salem, N.C., assignor to Electronic Data Controls Corporation, Winston-Salem, N.C.
Filed Jan. 13, 1975, Ser. No. 540,325
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—112



242,085
RAZOR HANDLE
Martin V. Maloney and David O. Chase, Skaneateles, N.Y., assignors to Philip Morris Incorporated
Filed May 27, 1975, Ser. No. 580,883
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A

242,086
MOVING ADVERTISING SIGN DISPLAY FOR STORES
John J. Casparro, Canoga Park, Calif., assignor to Don Fedderson Productions, Inc., Studio City, Calif.
Filed July 10, 1975, Ser. No. 594,780
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R

242,087
ILLUMINATED SIGN
Melbourne C. Reeves, Wheatridge, Colo., assignor to Keene Corporation, New York, N.Y.
Filed Apr. 9, 1975, Ser. No. 566,340
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF OCTOBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A & E Allied Plastics: *See—*
Crane, Walton B., 3,987,898.

AB Liros Elektronik: *See—*
Svensson, Lars-Erik; and Rodin, Sylvi, 3,988,673.

Abbott Laboratories: *See—*
Chittenden, Richard Marion; Bryant, Peter Lorin; and Classen, Charles Carlock, 3,987,791.
Paris, Gerard Yvon; and Garmaise, David Lyon, 3,988,446.

ABC Packaging Machine Corporation: *See—*
Reichert, Donald G., 3,987,710.

Abdallah, Abdulmuniem H.; and Shea, Philip J., to Dow Chemical Company, The. N,N'-dialkyl-halobenzamidines as antidepressants. 3,988,474, Cl. 424-326.000.

Abe, Kuniomi: *See—*
Ikegami, Yoshizo; Abe, Kuniomi; Kushibe, Seijiro; Yoshinaga, Takao; and Okada, Tsunemasa, 3,988,530.

Abrosimov, Vladimir Alexandrovich: *See—*
Kuznetsov, Jury Nikolaevich; and Abrosimov, Vladimir Alexandrovich, 3,987,967.

ACF Industries, Incorporated: *See—*
Peters, Clifford M., 3,987,817.

Achelpohl, Fritz, to Windmoller & Holscher. Apparatus for applying fluent thermoplastic materials. 3,987,754, Cl. 118-410.000.

Achelpohl, Fritz, to Windmoller & Holscher. Apparatus for depositing flat articles fed between belts. 3,988,019, Cl. 271-180.000.

Achenbach, Dieter: *See—*
Kolb, Walter; and Achenbach, Dieter, 3,987,936.

Adams, Herbert J. F.; Anderson, Jon C.; Blair, Murray R., Jr.; Di Rubio, Robert L.; and Takman, Bertil H., to Astra Pharmaceutical Products, Inc. Tertiary-alkylamino-lower acyl-xylidide local anaesthetics. 3,988,473, Cl. 424-324.000.

Addressograph Multigraph Corporation: *See—*
Goodwin, Eber Lyle, 3,987,722.
Root, Russell L., 3,988,061.

Adelkoff, Stuart: *See—*
Roberts, Arnold L.; and Adelkoff, Stuart, 3,988,113.

Aderholt, Paul J.: *See—*
Werzner, William F.; and Aderholt, Paul J., 3,988,264.

Agence Nationale de Valorisation de la Recharche (ANVAR): *See—*
Dubois, Jacques Emile; Lacaze, Pierre Camille; Le Gressus, Claude; and Massignon, Daniel, 3,988,222.

AGFA-Gevaert, A.G.: *See—*
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Lermann, Peter; Vogt, Stefan; and Rieder, Alois, 3,988,747.
Wick, Richard; Pfeifer, Josef; and Schausberger, Helmut, 3,988,756.
Winkler, Alfred; Engelsmann, Dieter; and Wagner, Karl, 3,988,752.

AGFA-GEVAERT N.V.: *See—*
Jeurissen, Lambert Gaston; and De Smedt, Frans Antoon, 3,988,301.
Van Paesschen, August Jean; and Van Gossum, Lucien Janbaptist, 3,988,157.

Aichinger, Dietmar, to Albert Obrist AG. Closure for containers. 3,987,921, Cl. 215-307.000.

Air Products and Chemicals, Inc.: *See—*
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., 3,988,267.
Dixon, Dale D.; and Hayes, Larry J., 3,988,491.
Uffner, Melville W., 3,988,290.

Aisin Seiki Kabushiki Kaisha: *See—*
Murakami, Noboru; Hirozawa, Koichiro; Matsuo, Koichi; and Obara, Kazuo, 3,987,690.
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Aitken, Donald F., Jr.: *See—*
Tuzzeo, James J.; and Aitken, Donald F., Jr., 3,987,670.

Akebono Brake Industry Co., Ltd.: *See—*
Aoki, Kazuhiko; and Iida, Kennosuke, 3,988,042.

Aktiebolaget Original-Odhner: *See—*
Sultan, Stig Bertil, 3,988,745.

Aktiebolaget Svenska Flaktfabriken: *See—*
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Aktiebolaget Tudor: *See—*
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Akutagawa, Susumu: *See—*
Nagakura, Akira; Akutagawa, Susumu; and Kurihara, Haruki, 3,988,366.

Alberelli, Alberino; and Alberelli, Ida, to Lawrence Peska Associates, Inc., a part interest. Spool magazine. 3,987,978, Cl. 242-134.000.

Alberelli, Ida: *See—*
Alberelli, Alberino; and Alberelli, Ida, 3,987,978.

Albert Obrist AG: *See—*
Aichinger, Dietmar, 3,987,921.

Alberts, Heinrich; Schulz-Walz, Hansjochen; Bartl, Herbert; Goerden, Leonhard; and Schuster, Klaus, to Bayer Aktiengesellschaft. Polymerizable organic dispersion of unsaturated polyester vinyl monomer and EVA copolymers. 3,988,388, Cl. 260-862.000.

Alberts, Heinrich: *See—*
Prinz, Richard; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, 3,988,390.

Albright, Charles William; and Davis, Hubert Greenidge, to Union Carbide Corporation. Process for the continuous hydrocarbonization of coal. 3,988,236, Cl. 208-8.000.

Albright, Charles William: *See—*
Davis, Hubert Greenidge; Albright, Charles William; Potter, John Johnson, Jr.; and Strick, Carl Edwin, 3,988,237.

Aldrich, Paul H.; and Dumas, David H., to Hercules Incorporated. Water-dispersible thermosettable cationic resins and paper sized therewith. 3,988,280, Cl. 260-29.2EP.

Alewitz, Sam, to Perfection Corporation. Gas riser apparatus and method. 3,987,820, Cl. 138-109.000.

Alexander, Donald R.; and Johnson, Carl W., to Alexander, Donald R. Apparatus for manufacturing automobile license plates. 3,987,721, Cl. 101-18.000.

Alfa-Laval AB: *See—*
Johansson, Bjorn-Olow; and Palm, Bengt Arne, 3,988,112.

Allen, Joseph C., to Texaco Inc. Method for increasing the oil recovery from active water drive reservoirs. 3,987,853, Cl. 166-272.000.

Allen, Louis B.: *See—*
Rice, Robert R.; Nettle, Victor H.; Allen, Louis B.; and Green, Samuel I., 3,988,704.

Allied Chemical Corporation: *See—*
Mares, Frantisek, 3,988,319.
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Allis-Chalmers Corporation: *See—*
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Allmanna Svenska Elektriska Aktiebolaget: *See—*
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Alpha Denshi Kabushiki Kaisha: *See—*
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Alpha Sheet Metal Works, Inc.: *See—*
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Alphatype Corporation: *See—*
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Alter, H. Ward, to Terradex Corporation. Method and apparatus for underground deposit detection in water covered areas. 3,987,677, Cl. 73-421.50R.

Aluminum Company of America: *See—*
Kondis, Thomas J., 3,988,146.

Alza Corporation: *See—*
Eckenhoff, James Benjamin; Johnson, Neil Arthur; and Yum, Su Il, 3,987,790.

Amano, Yoshinao: *See—*
Yamaguchi, Terumoto; and Amano, Yoshinao, 3,988,623.

Ambrosini, Leonard R., to Lear Siegler, Inc. Meridian seeking instrument. 3,988,659, Cl. 318-648.000.

American Can Company: *See—*
Gaudet, David Alvin; and Wathen, John Moss, Jr., 3,988,413.
Roteman, Jerome, 3,988,152.
Schlesinger, Sheldon Irwin, 3,988,159.
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American Cyanamid Company: *See—*
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Nozik, Arthur Jack; and Haacke, Gottfried, 3,987,781.
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American Equipment Corporation: *See—*
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American Home Products Corporation: *See—*
Garsky, Victor M., 3,988,304.
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American Hospital Supply Corporation: *See—*
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American Manufacturing & Equipment, Inc.: *See—*
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American Medical Systems, Inc.: *See*—
Timm, Gerald W.; and Burton, John H., 3,987,789.

American Potato Company: *See*—
MaGill, Perry W., 3,987,604.

Ames, Stanley R.; and Robeson, Charles D., to Eastman Kodak Company. Acetic acid-protein compositions with decreased rumen digentibility. 3,988,480, Cl. 426-2.000.

Ametek, Inc.: *See*—
Bohenek, Leonard J.; and Grier, David G., 3,987,821.

Amick, James L. Wind-powered flying boat. 3,987,982, Cl. 244-16.000.

AMP Incorporated: *See*—
Bakermans, Johannes Cornelis Wilhelmus; Barnes, Ronald Bruce; and Sywulka, Richard Anthony, 3,988,102.
Hooper, Dean Roosevelt, Jr., 3,988,555.
Moser, Jesse Lee; Reavis, Robert Philmore; and Soderstrom, Melvin Andrew, 3,988,707.
Swengel, Robert Charles, Sr.; and Crumley, J. A., 3,988,563.
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Anders, Dietmar; and Capelle, Gerd, to Hermann Berstorff Maschinenbau GmbH. Extruder slot die head. 3,988,097, Cl. 425-192.00R.

Andersen, Jorgen Walther: *See*—
Leitner, Frank Wilhite; Baker, Walter Louis, III; Barker, Jeter Olive, Jr.; and Andersen, Jorgen Walther, 3,988,577.

Andersen, Kjeld Jorn; Candia, Roberto; and Rostrup-Nielsen, Jens, to Haldor Topsoe A/S. Methanation catalyst and process for preparing the catalyst. 3,988,262, Cl. 252-466.00J.

Anderson, Axel J. Mobile pedal propulsion for small boats. 3,987,749, Cl. 115-25.000.

Anderson, David A.: *See*—
LaGue, David H.; Anderson, David A.; and Nichols, Stephen R., 3,987,838.

Anderson, David John. Theft alarm. 3,988,724, Cl. 340-224.000.

Anderson, Harold G.; and Louden, Robert E., to General Electric Company. Lead wire forming apparatus for incandescent filaments. 3,988,630, Cl. 313-331.000.

Anderson, Jon C.: *See*—
Adams, Herbert J. F.; Anderson, Jon C.; Blair, Murray R., Jr.; Di Rubio, Robert L.; and Takman, Bertil H., 3,988,473.

Anderson, Richard B.: *See*—
Fuehrer, Reece R.; and Anderson, Richard B., 3,987,874.

Anderson, Robert J.: *See*—
Angell, Richard G., Jr.; Anderson, Robert J.; Hobbs, Kenneth E.; James, David E.; and Marsh, B. Duane, 3,988,403.

Anderson, Robert V., to Producers Specialty & Mfg. Co., Inc. Toilet flush assembly. 3,987,501, Cl. 4-67.00R.

Anderson, Tage O.: *See*—
United States of America, National Aeronautics and Space Administration; and Anderson, Tage O., 3,988,716.

Anderson, Victor F., to Shell Oil Company. Aerosol safety cap permanently welded to container. 3,988,186, Cl. 156-69.000.

Andreas Stihl Maschinenfabrik: *See*—
Ratz, Adolf; and Schafer, Robert, 3,987,543.

Andreasen, Arthur A.; Bronsky, Albert J.; and Bruce, Wendell L., to Joseph E. Seagram & Sons, Inc. Production of glucoamylase for conversion of grain mashes in the production of grain spirits. 3,988,204, Cl. 195-15.000.

Andrews, Jeremy Charles; and Shannon, Gordon Brian Roger, to Imperial Chemical Industries Limited. Device for firing an electric detonator. 3,987,729, Cl. 102-22.00R.

Angell, Richard G., Jr.; Anderson, Robert J.; Hobbs, Kenneth E.; James, David E.; and Marsh, B. Duane, to Union Carbide Corporation. Process for producing molded structural foam article having a surface that reproducibly and faithfully replicates the surface of the mold. 3,988,403, Cl. 264-45.500.

Anisimov, Viktor Vasilievich: *See*—
Naratov, Alexei Mikhailovich; Legostaev, Valery Leonidovich; Gusev, Boris Sergeevich; Nadzharov, Oleg Eduardovich; Osipov, Valentin Ivanovich; Anisimov, Viktor Vasilievich; Muratov, Enver Osmanovich; Tarasov, Ivan Ivanovich; Badenkov, Petr Fedorovich; Kepersha, Ljudvig Mikhailovich; Ionov, Valentin Alexandrovich; Drozdov, July Prokofievich; Shvets, Grigory Iosifovich; Kruglov, Ivan Ivanovich; and Leontiev, Mikhail Dmitrievich, 3,988,077.

Anstalt Europaische Handelsgesellschaft: *See*—
Frutiger, Peter, 3,988,721.

Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. Multiple P-N junction formation with an alloy droplet. 3,988,766, Cl. 357-60.000.

Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. High voltage deep diode power semiconductor switch. 3,988,767, Cl. 357-60.000.

Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. Deep diode silicon controlled rectifier. 3,988,768, Cl. 357-60.000.

Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. High voltage diodes. 3,988,769, Cl. 357-60.000.

Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. Deep finger diodes. 3,988,770, Cl. 357-60.000.

Anthony, Thomas R.: *See*—
Cline, Harvey E.; and Anthony, Thomas R., 3,988,757.
Cline, Harvey E.; and Anthony, Thomas R., 3,988,760.
Cline, Harvey E.; Anthony, Thomas R.; Kokosa, Richard A.; and Wolley, E. Duane, 3,988,762.
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Antonini, Athos: *See*—
Cicognani, Enrico; Caldarella, Riccardo; Antonini, Athos; and Lamartina, Alfonso, 3,988,547.

Aoki, Kazuhiko; and Iida, Kennosuke, to Akebono Brake Industry Co., Ltd. Vehicle antiskid control system. 3,988,042, Cl. 303-21.0BE.

Appleby, A. Edward: *See*—
Cooke, George H.; and Appleby, A. Edward, 3,987,624.

Applied Fluidics, Inc.: *See*—
Hass, Hyman; and Murphy, Terrence P., 3,987,664.

Applied Power Inc.: *See*—
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Aqua-Chem, Inc.: *See*—
Wang, Donald G. J., 3,988,245.

Aquatronics, Inc.: *See*—
McDavid, William T., 3,988,620.

Arai, Haruhiko; Tsujii, Kaoru; and Kasai, Hisashi, to Kao Soap Co., Ltd. Detergent compositions containing 1-hydroxyalkane-sulfate, surfactants, inorganic builder, having good rinsing characteristics. 3,988,265, Cl. 252-532.000.

Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha: *See*—
Ariyoshi, Junji; Ohnishi, Akira; Toda, Hiromi; Kunimori, Kametaro; and Nakao, Mitsuyoshi, 3,988,503.

Aralov, Mstislav Semenovich: *See*—
Mitin, Igor Viktorovich; and Aralov, Mstislav Semenovich, 3,988,743.

Arendsen, Hans: *See*—
Cherubim, Martin; Wilms, Elmar; and Arendsen, Hans, 3,988,384.

Arens, Cornelis G. Taping attachment or device. 3,988,193, Cl. 156-446.000.

Argoudelis, Alexander D.; and Mizsak, Stephen A., to Upjohn Company, The. Compound U-50,228, derivatives thereof, and processes for preparation. 3,988,314, Cl. 536-1.000.

Ariyoshi, Junji; Ohnishi, Akira; Toda, Hiromi; Kunimori, Kametaro; and Nakao, Mitsuyoshi, to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha. Treating agent useful for fibrous materials and preparation thereof. 3,988,503, Cl. 526-23.000.

Armadillo Holdings Ltd.: *See*—
Atkins, Stanley G., 3,987,857.

Arnold, Dan M.: *See*—
Peelman, Harold E.; Arnold, Dan M.; and Pitts, Robert W., Jr., 3,988,581.

Aro-Sac Inc.: *See*—
Saccoccio, Nazareno J., 3,987,644.

Artamonov, Viktor Leonidovich: *See*—
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Latash, Jury Vadimovich; Chekotilo, Leonty Vasilievich; Baglai, Vitaly Mikhailovich; Artamonov, Viktor Leonidovich; Garkaljuk, Rodimir Ivanovich; Timchenko, Viktor Anatolievich; Malichenko, Evgeny Fedorovich; Stupak, Leonid Mikhailovich; and Dubinsky, Rudolf Solomonovich, 3,987,843.

Artho, Antoine; Beringer, Monique; Buchman, Paul; and Koch, Robert, to Tamag Basel AG. Smokable product with meerschaum particles. 3,987,800, Cl. 131-15.00R.

Artho, Antoine; Beringer, Monique; Buchmann, Paul; and Koch, Robert, to Tamag Basel AG. Smokeable product with meerschaum particles as absorbents. 3,987,801, Cl. 131-17.00R.

Arthur, Jett C., Jr.: *See*—
Mod, Robert R.; Harris, James A.; Arthur, Jett C., Jr.; Magne, Frank C.; Sumrell, Gene; and Novak, Arthur F., 3,988,226.

Arvin Industries, Inc.: *See*—
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Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Nakagawa, Yoshiro; Nonaka, Kohei; and Fukumoto, Chiyoshi, 3,987,529.
Nakamura, Masafumi; Fujii, Tadahiro; Nagashima, Hiromi; and Henmi, Hiroshi, 3,988,406.
Ogawa, Tsutomu; Wakita, Eiichi; and Kobayashi, Takahiro, 3,988,426.
Satake, Kunio; Wada, Takeshi; Sakamoto, Kuniaki; Harada, Hiroshi; and Sato, Yasushi, 3,988,275.

Asakura, Norio, to Hamamatsu Terebi Kabushiki Kaisha. Photocathode made of a semiconductor single crystal. 3,988,497, Cl. 428-409.000.

Ashland Oil, Inc.: *See*—
Watts, Golden F.; and Coats, Carlton E., 3,988,272.

Asmussen, Daniel Richard, to Tel-Tone Corporation. Step-servoed tone detector. 3,988,687, Cl. 328-167.000.

Aspin, Frank Metcalf. Machines for treating filaments of plastics materials. 3,988,101, Cl. 425-363.000.

Associated Engineering Limited: *See*—
Atkins, Francis James; and Fisher, Ian Albert, 3,988,646.

Astle, Thomas W., to Cozy, Michael J. Lighting control. 3,988,553, Cl. 200-38.0BA.

Astra Pharmaceutical Products, Inc.: *See*—
Adams, Herbert J. F.; Anderson, Jon C.; Blair, Murray R., Jr.; Di Rubio, Robert L.; and Takman, Bertil H., 3,988,473.

Atel Products Limited: *See*—
Jones, Rodney Vernon, 3,988,006.

Atkin, Robert B.; Tarmann, Frederick C.; and Wong, John H., to International Business Machines Corporation. Heat fuser roll and method of manufacture. 3,987,530, Cl. 29-132.000.

Atkins, Francis James; and Fisher, Ian Albert, to Associated Engineering Limited. Ignition devices. 3,988,646, Cl. 317-96.000.

Atkins, Stanley G., to Armadillo Holdings Ltd. Side cutting device for earth boring procedures. 3,987,857, Cl. 175-53.000.

Atlantic Richfield Company: *See—*
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Auer, Hans Heinrich: *See—*
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Aunstrup, Knud, to Novo Terapeutisk Laboratorium A/S. Preparation of a milk-coagulating enzyme. 3,988,207, Cl. 195-62.000.

Ausnit, Steven. Separably connective flexible toy. 3,987,580, Cl. 46-25.000.

Austin, Dennis T.: *See—*
Holroyd, George C.; and Austin, Dennis T., 3,988,490.

Austin, Lowell W.; Smith, Edwin J.; and McGraw, Leslie D., to National Steel Corporation. Method of producing metal strip having a galvanized coating on one side while preventing the formation of a zinc deposit on cathode means. 3,988,216, Cl. 204-28.000.

Austin, Paul Rolland, to University of Delaware, The. Chitin as an extender and filter for tobacco. 3,987,802, Cl. 131-17.00R.

Automated Energy Systems, Inc.: *See—*
Leitner, Frank Wilhite; Baker, Walter Louis, III; Barker, Jeter Olive, Jr.; and Andersen, Jorgen Walther, 3,988,577.

Automobiles Peugeot: *See—*
Chamdru, Jacques Andre, 3,987,842.

AVAG Betriebsverpflegungs A.G.: *See—*
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Azuma, Masao: *See—*
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B. F. Goodrich Company, The: *See—*
Krupp, Carroll P., 3,987,865.
Powell, Joe A.; and James, Paul C., 3,987,833.

Babcock, Donald; Modjeski, Richard; and Holman, Perry, to Johnson & Johnson. Apparatus and method for applying label stock. 3,988,194, Cl. 156-459.000.

Babcock, Roger M. Skate sharpening machine. 3,988,124, Cl. 51-96.000.

Babcock & Wilcox Company, The: *See—*
Jabsen, Felix S., 3,987,860.

Babiec, John S., Jr.: *See—*
Puig, John E.; and Babiec, John S., Jr., 3,988,269.

Bachmann, Klaus Jurgen; Buehler, Ernest; Shay, Joseph Leo; and Wagner, Sigurd, to Bell Telephone Laboratories, Incorporated. Annealing solar cells of InP/CdS. 3,988,172, Cl. 148-1.500.

Badenkov, Petr Fedorovich: *See—*
Naratov, Alexei Mikhailovich; Legostaev, Valery Leonidovich; Gusev, Boris Sergeevich; Nadzharov, Oleg Eduardovich; Osipov, Valentin Ivanovich; Anisimov, Viktor Vasilievich; Muratov, Enver Osmanovich; Tarasov, Ivan Ivanovich; Badenkov, Petr Fedorovich; Kepersha, Ljudvig Mikhailovich; Ionov, Valentin Alexandrovich; Drozdov, July Prokofievich; Shvets, Grigory Iosifovich; Kruglov, Ivan Ivanovich; and Leontiev, Mikhail Dmitrievich, 3,988,077.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Platz, Rolf; Fuchs, Werner; and Dudeck, Christian, 3,988,379.

Baehr, Donald O., to United States Gypsum Company. Fire resistant doors. 3,987,600, Cl. 52-615.000.

Baglai, Vitaly Mikhailovich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Latash, Jury Vadimovich; Chekotilo, Leonty Vasilievich; Baglai, Vitaly Mikhailovich; Artamonov, Viktor Leonidovich; Garkaljuk, Rodimir Ivanovich; Timchenko, Viktor Anatolievich; Malichenko, Evgeny Fedorovich; Stupak, Leonid Mikhailovich; and Dubinsky, Rudolf Solomonovich, 3,987,843.

Baier, Terence D.: *See—*
Ramsey, James R.; Baier, Terence D.; and Swim, William B., 3,988,130.

Baker, Don Robert, to Stauffer Chemical Company. Certain oxime carbonates. 3,988,357, Cl. 260-463.000.

Baker, Edward D.: *See—*
Lang-Ree, Nils; and Baker, Edward D., 3,987,718.

Baker, James C.; and Bauer, Robert E., to Bethlehem Steel Corporation. Soldering flux and method. 3,988,175, Cl. 148-26.000.

Baker Oil Tools, Inc.: *See—*
Callihan, Rudy B.; Meyer, Jerry W.; Wainwright, Clyde S., Jr.; and Taylor, Bobby B., 3,987,854.

Baker Perkins Holdings Limited: *See—*
Johnson, Reginald Frank, 3,987,605.

Baker, Walter Louis, III: *See—*
Leitner, Frank Wilhite; Baker, Walter Louis, III; Barker, Jeter Olive, Jr.; and Andersen, Jorgen Walther, 3,988,577.

Bakermans, Johannes Cornelis Wilhelmus; Barnes, Ronald Bruce; and Sywulka, Richard Anthony, to AMP Incorporated. Crimpable plastic bundle tie. 3,988,102, Cl. 425-394.000.

Baldwin, Le Roy: *See—*
Teumer, Roger G.; Jackson, Earl V.; Hermanson, Herman A.; and Baldwin, Le Roy, 3,988,060.

Balland, Jean, to Manufacture de Produits Chimiques Protex. Process for the dyeing of textile fibers in an organic-system medium. 3,988,111, Cl. 8-172.00R.

Ballard, Edward Cooper; and Priest, John Ricks, to Du Pont de Nemours, E. I., and Company. Reduced melt index, low gel content ethylene copolymers and process for preparation thereof. 3,988,509, Cl. 528-491.000.

Ballard, Richard James: *See—*
Vance, Gary Charles; and Ballard, Richard James, 3,988,690.

Balzer, Norbert R.: *See—*
Del Paggio, Anthony F.; and Balzer, Norbert R., 3,988,179.

Barber, Roy, to Land Pyrometers Limited. Burner control. 3,988,104, Cl. 431-90.000.

Bardotti, Angelo, to Honeywell Information Systems Italia. Computer input/output apparatus for providing notification of and distinguishing among various kinds of errors. 3,988,714, Cl. 340-146.1AG.

Barker, Jeter Olive, Jr.: *See—*
Leitner, Frank Wilhite; Baker, Walter Louis, III; Barker, Jeter Olive, Jr.; and Andersen, Jorgen Walther, 3,988,577.

Barker, Noble G., to Caterpillar Tractor Co. Seals for rotary engines. 3,988,078, Cl. 418-51.000.

Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See—*
Mayer, Manfred, 3,987,974.

Barner, Herbert E.; Kust, Roger N.; and Cox, Robert P., to Kennecott Copper Corporation. Elevated pressure operation in the cuprion process. 3,988,416, Cl. 423-33.000.

Barnes, Ronald Bruce: *See—*
Bakermans, Johannes Cornelis Wilhelmus; Barnes, Ronald Bruce; and Sywulka, Richard Anthony, 3,988,102.

Barnette, L. H.: *See—*
Liang, C. C.; and Barnette, L. H., 3,988,164.

Barr, William Morrison. Recovery of precious metal values from ores. 3,988,415, Cl. 423-22.000.

Barriere, Jacques; and Robaglia, Michele, to Commissariat a l'Energie Atomique. Method of extraction of metallic elements from submarine nodules. 3,988,224, Cl. 204-108.000.

Barter, James A.; Stevens, Henry C.; and Van Hoozer, John F., to PPG Industries, Inc. Frozen organic peroxide emulsion. 3,988,261, Cl. 252-431.00C.

Barth, Manfred Hans, to Timex Corporation. Hand setting device for small switches. 3,987,618, Cl. 58-85.500.

Bartholomew, Ralph L.: *See—*
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Bauer, Gunther: *See—*
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Baumann, Horst: *See—*
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Baumoel, Joseph. Transducer structure and support for fluid measuring device. 3,987,674, Cl. 73-194.00A.

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Bayer Aktiengesellschaft: *See—*
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Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 3,988,458.
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Jager, Kurt; Kunz, Eugen; and Vlah, Josko, 3,988,625.
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Beall, Donald L.; Talbot, Lee A.; and Thompson, Theodore N., to General Electric Company. Digitally controlled analog flux sensing ferrite phase shifter driver. 3,988,686, Cl. 328-155.000.

Beam, Benjamin H., to Beam Engineering, Inc. Apparatus for enhancing the output of photovoltaic solar cells. 3,988,166, Cl. 136-89.000.

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Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., to Air Products and Chemicals, Inc. Quaternary hydroxyalkyl tertiary amine bases as polyurethane catalysts. 3,988,267, Cl. 260-2.5AC.

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Becker, Otto Alfred. Electrical resistance welding of coated sheet metals. 3,988,562, Cl. 219-93.000.

Becton, Dickinson and Company: *See—*
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Beers, Ronald Wentworth, to Exxon Research and Engineering Company. Quick-curing water resistant silica-alkali metal coatings and processes therefor. 3,988,282, Cl. 260-29.70H.

Beery, Jack; and Wisner, Daniel A., to Burroughs Corporation. System for predicting or detecting a fault in a solenoid utilization system. 3,988,664, Cl. 324-28.00R.

Beisch, Hanspeter Ehrenfried: *See—*
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Bennes Marrel: *See—*
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Bennett, James G.; and Cooper, Glenn D., to General Electric. Process for the preparation of polyphenylene ethers with activated copper-amine catalysts. 3,988,297, Cl. 260-47.0ET.

Bennett, William E.; and Leach, Imon E. Control circuit for driving a position indicator in an aircraft flight data display. 3,988,735, Cl. 343-112.0PT.

Bennewitz, Paul F. Relative humidity detector. 3,987,676, Cl. 73-336.500.

Benson, Wilfred Y.: *See—*
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Berger, Robert; Gloor, Hans-Jacob; and Tschol, Wilhelm, to BBC Brown Boveri & Company Limited. Wall lead-throughs for live feeders. 3,988,527, Cl. 174-142.000.

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Berstein, Gregor, to Cabot Corporation. Paper coated with organic pigment-containing coating colors. 3,988,522, Cl. 428-323.000.

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Bethlehem Steel Corporation: *See—*
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Bianchetta, Donald L., to Caterpillar Tractor Co. Controls for multiple variable displacement pumps. 3,987,626, Cl. 60-445.000.

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Billi, S.p.A.: *See—*
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Birat, Jean-Pierre, to Institut de Recherches de la Siderurgie Francaise (IRSID). Method and apparatus for continuously casting of metal in horizontal direction. 3,987,840, Cl. 164-49.000.

Birchenough, William D. Apparatus for heat forming a continuous web of plastic. 3,988,093, Cl. 425-174.400.

Bishop, Thomas R.: *See—*
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Bjorklund, Curt Arnold. Burner scavenging valve. 3,987,810, Cl. 137-107.000.

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Blanc, Bernard; Boudou, Jean; Castaing, Alain; Clasquin, Jean; Gallet, Bernard; Saglio, Robert; and Samoel, Alain, to Commissariat a l'Energie Atomique. Device for remote inspection and testing of a structure. 3,987,666, Cl. 73-67.80S.

Bland, James R.; and Dauwalder, Fred R., to Caterpillar Tractor Co. Adjustable torque friction clutch. 3,987,687, Cl. 74-531.000.

Blessing, Alfred V. Preserving container for liquid food substances. 3,987,941, Cl. 222-386.000.

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Bloodworth, John M.: *See—*
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Bloss, David M.: *See—*
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Blumberg, Jonathan Mark; and Moore, Alan John, to Gec-Elliott Automation Limited. Automatic systems for the dynamically positioning of a floating vessel. 3,987,744, Cl. 114-144.00B.

Boast, Warren B., to Iowa State University Research Foundation, Inc. Method and apparatus for frequency compensation of electromechanical transducer. 3,988,541, Cl. 179-1.00D.

Bober, Henry T.: *See—*
Mileski, Raymond P.; Bober, Henry T.; and Mitchel, James O., 3,988,065.

Bobkowicz, Emilian. Method and apparatus for manufacture of composite yarn products. 3,987,612, Cl. 57-34.0HS.

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Boekhorst, Antonius, to U.S. Philips Corporation. Circuit arrangement for generating in a picture display device a sawtooth current of line frequency having an amplitude varying at field frequency. 3,988,637, Cl. 315-371.000.

Bogdanov, Ivan Georgiev, to DSO "Pharmachim". Remedy for treating gastritis, gastric and duodenal ulcers. 3,988,440, Cl. 424-115.000.

Boguth, Walter; Leuenberger, Hans Georg Wilhelm; Mayer, Hans Johann; Widmer, Erich; and Zell, Reinhard, to Hoffmann-La Roche Inc. Optically active cyclohexane derivatives. 3,988,205, Cl. 195-51.00R.

Bohenek, Leonard J.; and Grier, David G., to Ametek, Inc. Gas-filled thermometer. 3,987,821, Cl. 138-177.000.

Bohme, Rudolf; Heinecke, Klaus; and Hock, Fromund, to Ernst Leitz G.m.b.H. Method and apparatus for generating a switching signal using odd and even harmonics and comparison of rectified harmonics to ratio potential. 3,988,683, Cl. 328-61.000.

Boisrayon, Gerald M.; Martin, Gilbert M.; and Mollard, Jean C., to Etat Francais represente par le Deleque Ministeriel pour l'Armement. Swivel air lock for airtight connection between submergibles. 3,987,742, Cl. 114-16.600.

Bolon, Donald A.; Lucas, Gary M.; and Bartholomew, Ralph L., to General Electric Company. Method for making a circuit board and article made thereby. 3,988,647, Cl. 317-101.00B.

Bonalumi, Ettore. Pneumatic dust collecting system for fiber processing machine. 3,987,517, Cl. 19-107.000.

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Bone, Ted E. Power cutting means. 3,987,607, Cl. 56-16.200.

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Born, Gunthard, to Messerschmitt-Bolkow-Blohm GmbH. Gasdynamic molecular laser. 3,988,700, Cl. 331-94.50P.

Bosch, Paul, to Robert Bosch G.m.b.H. Multiple-unit pump. 3,987,707, Cl. 91-492.000.

Boss, Holm Diethard; and Butschek, Hans Albert, to Messerschmitt-Bolkow-Blohm GmbH. Method and device for electrohydraulic control of a hydraulic actuator. 3,987,702, Cl. 91-1.000.

Bossert, Friedrich: *See—*
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Bossler, Joseph A., III; and Fanning, Robert J., to Ethyl Corporation. Flame reaction process for producing hydrogen bromide. 3,988,427, Cl. 423-487.000.

Bottard, Gilles Jean Marcel; and Rottier, Marcel Rene, to Compagnie Honeywell Bull (Societe Anonyme). System for testing a data processing unit. 3,988,579, Cl. 235-153.0AK.

Boudou, Jean: *See—*
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Boudouris, Angelo, to Eprad Incorporated. Magnetically stabilized xenon arc lamp. 3,988,626, Cl. 313-113.000.

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Bouvaist, Jean Marie Amedee, to Societe de Vente de l'Aluminium Pechiney. Method for increasing the mechanical features and the resistance against corrosion under tension of heat-treated aluminum alloys. 3,988,180, Cl. 148-159.000.

Bowen Tools, Inc.: *See—*
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Bowers, George Keith. Back pack lubrication system. 3,987,869, Cl. 184-105.00R.

Bowman, Robert Mathews, to Ciba-Geigy Corporation. 1,4-Oxazepines as antidepressant agents. 3,988,448, Cl. 424-244.000.

Boxer, Steve, to Boxer, Steve. Process and device for alleviation of muscular and non-muscular pain and discomfort. 3,987,787, Cl. 128-1.00R.

Boyle, William J., Jr.: *See—*
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Bradner, Hugh, to Research Corporation. Suntan composition containing fluorescent compounds. 3,988,437, Cl. 424-59.000.

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Brickey, Orville G., to United States of America, Navy. 3-Channel selectable polarization, target discrimination antenna. 3,988,732, Cl. 343-100.0PE.

Brik, Michael D. Auxiliary fireplace structure. 3,987,778, Cl. 126-121.000.

Bristol-Myers Company: *See—*
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British Drug Houses Ltd., The: *See—*
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Bronsky, Albert J.: *See—*
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Brooks, Gary L., to Sta-Rite Industries, Inc. Cartridge filter. 3,988,244, Cl. 210-317.000.

Brown, Dale M.; Ghezzo, Mario; and Garfinkel, Marvin, to General Electric Company. Radiation sensing and charge storage devices. 3,988,613, Cl. 250-211.00J.

Brown, David George, to Texas Instruments Incorporated. Method of making devices having closely spaced electrodes. 3,987,538, Cl. 29-577.000.

Brown, Marvin L.: *See—*
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Brown, Paul L. Controlled multiple track toy system with modular attachments. 3,987,581, Cl. 46-44.000.

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Brown, Winton F. Bottle decapping method and apparatus. 3,987,535, Cl. 29-427.000.

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Brunato, Siro. Apparatus for racking drill pipes on floater type platforms. 3,987,910, Cl. 214-2.500.

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Bryant, Peter Lorin: *See—*
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Brzuskiewicz, John, to United States of America, Army. Composite protective coating for combustible cartridge cases. 3,987,731, Cl. 102-43.00R.

Buchel, Karl Heinz; and Hammann, Ingeborg, to Bayer Aktiengesellschaft. Trisalkyl tin 1,2,4-triazole insecticidal and acaricidal agents. 3,988,449, Cl. 424-245.000.

Buchel, Karl-Heinz: *See—*
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Buchmann, Paul: *See—*
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Budai, Zoltan: *See—*
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Buergin, Rodney G.: *See—*
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Bulanchuk, William J., to Midland-Ross Corporation. Trolley busway housing. 3,987,877, Cl. 191-23.00A.

Bunz, Peter: *See—*
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Burgess, Billy; McGilvery, Washington I.; Michael, John R.; Snyder, Robert P.; Burgess, John Henry, deceased; and by Burgess, Norma Lou, administratrix. Package inspection apparatus. 3,987,902, Cl. 209-75.000.

Burgess, John Henry, deceased: *See—*
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Burgess, Billy; McGilvery, Washington I.; Michael, John R.; Snyder, Robert P.; Burgess, John Henry, deceased; and Burgess, Norma Lou, administratrix, 3,987,902.

Burkett, Albert L. Centrifugal mill. 3,987,970, Cl. 241-43.000.

Burkhardt, Joseph A.; Loth, William D.; and Pattison, Martin O., to Exxon Production Research Company. Subsea structure and method for installing the structure and recovering the structure from the sea floor. 3,987,638, Cl. 61-88.000.

Burlington Industries, Inc.: *See—*
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Burns, Tom V.; and Pierres, Sergio Ortega. Process for making stable sludge-free ammonium polyphosphate fertilizer solutions. 3,988,140, Cl. 71-34.000.

Burroughs Corporation: *See—*
Beery, Jack; and Wisner, Daniel A., 3,988,664.
Romania, Samuel Richard; and Sprenkle, George Joseph, 3,987,823.

Burton, John H.: *See—*
Timm, Gerald W.; and Burton, John H., 3,987,789.

Burton, John S.; and Whitney, Ronald L., to Terminal Data Corporation. Two-sided document recorder. 3,988,062, Cl. 355-23.000.

Buske, Norman L., to Quadratics Inc. Expansible chamber device. 3,987,767, Cl. 123-51.00R.

Butschek, Hans Albert: *See—*
Boss, Holm Diethard; and Butschek, Hans Albert, 3,987,702.

Buxton, Edward J., to Buxton, Edward J.; Nolte, Albert C., Jr.; and Hladky, Walter, part interest to each. Printing apparatus with paper positioning tractor means and escapement means. 3,987,884, Cl. 197-49.000.

Cabot Corporation: *See—*
Berstein, Gregor, 3,988,522.
Dreyer, Dennis G.; Foley, Edward M.; and Rogers, Herbert E., Jr., 3,988,524.
Venal, Wilfredo V.; and Klein, Joseph H., 3,988,147.

Caire, Giorgio: *See—*
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Caldarella, Riccardo: *See—*
Cicognani, Enrico; Caldarella, Riccardo; Antonini, Athos; and Lamartina, Alfonso, 3,988,547.

California Institute of Technology: *See—*
Wu, Ta Tzu, 3,988,688.

Callihan, Rudy B.; Meyer, Jerry W.; Wainwright, Clyde S., Jr.; and Taylor, Bobby B., to Baker Oil Tools, Inc. Gravel packing apparatus and method. 3,987,854, Cl. 166-278.000.

Calspan Corporation: *See—*
Ruda, Ernest V.; Blickenstaff, John E.; and Schneider, Clayton J., Jr., 3,987,966.

Caluscos, Raphael P., to Raymond Lee Organization, Inc., The. Perfume dispenser. 3,987,935, Cl. 222-173.000.

Campbell, Henry Fred, to Campbell Research Corporation. Building construction. 3,987,714, Cl. 98-40.00D.

Campbell Research Corporation: *See—*
Campbell, Henry Fred, 3,987,714.

Campbell, Robert E.: *See—*
Munden, Curtis D.; and Campbell, Robert E., 3,988,618.

Canadian Patents and Development Limited: *See—*
Meadus, Frederick Weldon; Sparks, Bryan D.; and Puddington, Ira E., 3,987,730.

Candia, Roberto: *See—*
Andersen, Kjeld Jorn; Candia, Roberto; and Rostrup-Nielsen, Jens, 3,988,262.

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Iura, Yukio; Uchiyama, Takashi; Yamamichi, Masayoshi; Mashimo, Yukio; and Taguchi, Tetsuya, 3,988,748.
Katayama, Hajime; Torigai, Akiyoshi; and Onoda, Shigeyoshi, 3,987,756.
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Sone, Yoshiaki; and Sawada, Takamasa, 3,988,064.
Suzuki, Akiyoshi; and Kano, Ichiro, 3,988,066.

Canterbury, Robert Houston, to Dresser Industries, Inc. Pressure-balanced well service valve. 3,987,848, Cl. 166-224.00A.

Capelle, Gerd: *See—*
Anders, Dietmar; and Capelle, Gerd, 3,988,097.

Capolongo, Pasquale, to Lepel High Frequency Laboratories, Inc. Mobile inductors for induction heating systems. 3,988,559, Cl. 219-10.430.

Capozza, Richard Carl, to American Cyanamid Company. Spinning and shaping poly-(N-acetyl-D-glucosamine). 3,988,411, Cl. 264-184.000.

Carbonell, Jose; Hasler, Rolf; and Walliser, Roland, to Sandoz Ltd. Metering system. 3,987,808, Cl. 137-3.000.

Cardinal, Jutta; Heinrich, Karl; and Bauer, Gunther, to Hoechst Aktiengesellschaft. Voluminous filament yarn. 3,987,614, Cl. 57-140.0BY.

Carl, Joseph A.; Steinke, John F.; and Bloss, David M., to Smith International, Inc. Kelly crowd for vertical drill rig. 3,987,856, Cl. 173-149.000.

Carl Maufacturing Company Ltd.: *See—*
Mori, Chuzo, 3,987,565.

Carnation Company: *See—*
Loo, Ching C., 3,988,436.

Carosella, John H.: *See—*
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Carpenter Technology Corporation: *See—*
Esposito, David; Reiter, Raymond A.; and Del Corso, Gregory J., 3,988,084.

Carroll, Charles A. Marine vessel adapted to be powered and steered by a transported land vehicle. 3,987,748, Cl. 115-.50A.

Carroll, Felix P.: *See—*
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., 3,988,267.

Carter, Cecil O., to Phillips Petroleum Company. Process for producing ethyl fluoride product and alkylate product in HF alkylation. 3,988,385, Cl. 260-683.420.

Carter, Edward Sterling: *See—*
Kenigsberg, Irwin Jeffrey; and Carter, Edward Sterling, 3,988,074.

Carter, James R. Swimming exercise and training apparatus. 3,988,020, Cl. 272-125.000.

Casey, Thomas P., to Caterpillar Tractor Co. Weldment for bulldozer blades and method and apparatus therefor. 3,987,953, Cl. 228-166.000.

Castaing, Alain: *See—*
Blanc, Bernard; Boudou, Jean; Castaing, Alain; Clasquin, Jean; Gallet, Bernard; Saglio, Robert; and Samoel, Alain, 3,987,666.

Castegnier, Guy. Digital watch time setting system. 3,987,616, Cl. 58-23.00C.

Catalo, Irenee: *See—*
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Caterpillar Tractor Co.: *See—*
Barker, Noble G., 3,988,078.
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Bianchetta, Donald L., 3,987,626.
Bland, James R.; and Dauwalder, Fred R., 3,987,687.
Casey, Thomas P., 3,987,953.
Cochran, Thomas Eugene; and Moring, Rodger Lloyd, 3,988,071.
Corrigan, Ara L., 3,987,706.
Gee, James Edgar; and Stedman, Robert Norris, 3,987,561.
Goloff, Alexander; and Grim, George Butler, 3,988,081.
Hall, Gerald D., 3,987,814.
Johnson, Howard L., 3,987,622.
Johnson, Howard L., 3,987,704.
Koch, Keith E.; Untz, Robert W.; and Zook, Donald G., 3,987,990.
Latimer, Eugene E., 3,987,703.
Poplawski, Eugene M., 3,987,526.

Cates, Henry J., Jr.; Rosenberg, Tom; and Entrekin, Harvey E., to International Incinerators, Inc. Method of disposing of combustible material. 3,987,916, Cl. 214-152.000.

Cecil Instruments Manufacturing Limited: *See—*
Tarbet, Cecil Sidney Charles, 3,987,688.

Cegedur Societe de Transformation de l'Aluminium Pechiney: *See—*
Figueres, Roger; and Pitaval, Antoine, 3,987,536.

Cehovic, Georges D., to Nelson Research & Development Company. Cyclic nucleotide derivatives for treatment of hypothyroidism. 3,988,442, Cl. 424-180.000.

Celanese Coatings & Specialties Company: *See—*
Klassen, Harold C., 3,988,279.

Cenker, Moses: *See—*
Narayan, Thirumurti L.; and Cenker, Moses, 3,988,337.

Central Paper Company: *See—*
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Ceskoslovenska akademie ved: *See—*
Stol, Miroslav; Stoy, Vladimir; and Tuzar, Zdenek, 3,988,305.
Stoy, Artur; Stol, Miroslav; Stoy, Vladimir; and Zima, Jiri, 3,987,497.

Chamdru, Jacques Andre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Plastic core blow nozzle with fastening hooks. 3,987,842, Cl. 164-200.000.

Champion International Corporation: *See—*
Hanson, Wallace E., 3,987,893.

Champiot, Jean: *See—*
Walrave, Jean; and Champiot, Jean, 3,987,831.

Chandler Evans Inc.: *See—*
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Chaney, David R.; and Wendel, David G., to Safety Sports Mirror Co. Rear-view mirror device for attachment to the accessories of the user. 3,988,058, Cl. 350-298.000.

Chappell, Rulon A.: *See—*
Coulter, Samuel T.; Morris, Howard A.; and Chappell, Rulon A., 3,988,481.

Chase, Marston. Adhesive picture mount. 3,987,569, Cl. 40-158.00R.

Chaverebiere de Sal, Alain; Donnart, Rene Victor; and Darche, Michel Jean Paul, to Societe ECA. System for the exploration and inspection of sea beds by means of a vessel having an external power supply system. 3,987,745, Cl. 114-235.00B.

Chekotilo, Leonty Vasilievich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Latash, Jury Vadimovich; Chekotilo, Leonty Vasilievich; Baglai, Vitaly Mik-

hailovich; Artamonov, Viktor Leonidovich; Garkaljuk, Rodimir Ivanovich; Timchenko, Viktor Anatolievich; Malichenko, Evgeny Fedorovich; Stupak, Leonid Mikhailovich; and Dubinsky, Rudolf Solomonovich, 3,987,843.

Chemical Additives Company: *See*—
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Chemie Linz Aktiengesellschaft: *See*—
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Cheng, King Y.: *See*—
Motley, David M.; and Cheng, King Y., 3,988,539.

Chernyshev, Vitaly Fedorovich: *See*—
Nazarov, Vladimir Georgievich; Nepokrytykh, Vladimir Konstantinovich; Vasilevskaya, Ljubov Markovna; Rusyanova, Natalya Dmitrievna; Volgina, Natalya Borisovna; Chernyshev, Vitaly Fedorovich; Chetverikova, Nina Alexandrovna; and Kostromin, Alexandr Stepanovich, 3,988,354.

Cherubim, Martin; Wilms, Elmar; and Arendsen, Hans, to Deutsche Texaco Aktiengesellschaft. Conversion of olefins using improved catalysts. 3,988,384, Cl. 260-683.00D.

Chetverikova, Nina Alexandrovna: *See*—
Nazarov, Vladimir Georgievich; Nepokrytykh, Vladimir Konstantinovich; Vasilevskaya, Ljubov Markovna; Rusyanova, Natalya Dmitrievna; Volgina, Natalya Borisovna; Chernyshev, Vitaly Fedorovich; Chetverikova, Nina Alexandrovna; and Kostromin, Alexandr Stepanovich, 3,988,354.

Chevron Research Company: *See*—
Kohn, Gustave K., 3,988,471.
Magee, Philip S., 3,988,376.
Rosenthal, Joel W.; and Kozlowski, Robert H., 3,988,122.

Chia, Tung-Yu. Method of desulfurizing coal. 3,988,120, Cl. 44-1.00R.

Chianelli, Russell R., to University of Rochester. Methods of fabricating thermonuclear fuel elements. 3,987,590, Cl. 51-323.000.

Chicago Bridge & Iron Company: *See*—
Sattelberg, Stanley E., 3,987,925.

Chicago Pneumatic Tool Company: *See*—
Lesner, Richard S.; and Roth, Robert D., 3,987,692.

Chicago Rawhide Manufacturing Company: *See*—
Reichenbach, Jerry D., 3,988,091.

Chimura, Kazuya; Iwata, Hiroshi; Kaneko, Takashi; and Nakazono, Ryuichi, to Mitsubishi Rayon Co., Ltd. Polyester fibers having excellent dyeability. 3,988,387, Cl. 260-860.000.

Chittenden, Richard Marion; Bryant, Peter Lorin; and Classen, Charles Carlock, to Abbott Laboratories. Additive transfer unit having a slidable piercing member. 3,987,791, Cl. 128-272.300.

Chiu, Ran-Fun: *See*—
Scott, John B.; Whang, Sang Y.; Ragsdale, Robert G.; and Chiu, Ran-Fun, 3,988,540.

Chloride Batteries Australia Limited: *See*—
McLean, Thomas Fraser, 3,988,169.

Christy, Marcia Elizabeth, to Merck & Co., Inc. Phenylalkylaralkylamines for pharmaceutical use. 3,988,454, Cl. 424-248.000.

Ciba-Geigy AG: *See*—
Hegar, Gert, 3,988,311.

Ciba-Geigy Corporation: *See*—
Bowman, Robert Mathews, 3,988,448.
Dorhofer, Gunther; Heckendorn, Roland; Schmid, Erich; Storni, Angelo; and Zust, Armin, 3,988,467.
Karrer, Friedrich; and Farooq, Saleem, 3,988,477.
Kristiansen, Odd, 3,988,445.
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Roueche, Armand, 3,988,312.
Spivack, John D.; and Dexter, Martin, 3,988,363.
Wirth, Hermann O.; Friedrich, Hans-Helmut; and Linhart, Helmut, 3,988,378.

Cicognani, Enrico; Caldarella, Riccardo; Antonini, Athos; and Lamartina, Alfonso, to Societa Italiana Telecomunicazioni Siemens S.p.A. Telecommunication system having means for converting multifrequency selection signals into digital pulse trains. 3,988,547, Cl. 179-16.0EC.

Cincinnati Milacron, Inc.: *See*—
Losey, Jerry Earl; Witzel, John Richard; and Kauffman, Harry Dean, 3,988,560.
Piotrowski, Tadeusz Wiktor, 3,987,909.

Circle Seal Corporation: *See*—
Springer, Colby M., 3,988,706.

Cities Service Company: *See*—
Roth, Shirley H., 3,988,266.
Wiggins, Louis E., 3,988,478.

Citizen Watch Co., Ltd.: *See*—
Nakayama, Toshihiko; Hishida, Hiroshi; Wakabayashi, Hisao; Yoshikawa, Hisao; and Koyama, Isao, 3,988,621.

Civardi, Frank Peter, to Inmont Corporation. Leatherlike fabrics. 3,988,488, Cl. 428-89.000.

Clark Equipment Company: *See*—
McKenzie, Ian, 3,987,826.
Rao, Kamlaker P.; Lowe, William L.; and Nephew, O. Thomas, 3,987,594.

Clark, Jeri O.; Hankins, Bobby J.; and Cottrell, Walter D., Jr., to Owens-Corning Fiberglas Corporation. Molding compositions of a resin and hydrated cement. 3,988,289, Cl. 260-38.000.

Clarke, James McMillen; Hearty, Charles E.; and Rougas, John A., to General Electric Company. Wideband receiving system including multi-channel filter for eliminating narrowband interference. 3,988,679, Cl. 325-377.000.

Clasquin, Jean: *See*—
Blanc, Bernard; Boudou, Jean; Castaing, Alain; Clasquin, Jean; Gallet, Bernard; Saglio, Robert; and Samoel, Alain, 3,987,666.

Classen, Charles Carlock: *See*—
Chittenden, Richard Marion; Bryant, Peter Lorin; and Classen, Charles Carlock, 3,987,791.

Clausen, Edward M., to General Electric Company. Metal halide lamp with titania-silicate barrier zone in fused silica envelope. 3,988,628, Cl. 313-112.000.

Clayton, Abner W. Retriever for snagged fishing lures. 3,987,573, Cl. 43-17.200.

Cline, Harvey E.; and Anthony, Thomas R., to General Electric Company. Deep diode zeners. 3,988,757, Cl. 357-13.000.

Cline, Harvey E.; and Anthony, Thomas R., to General Electric Company. Deep diode bilateral semiconductor switch. 3,988,760, Cl. 357-39.000.

Cline, Harvey E.; Anthony, Thomas R.; Kokosa, Richard A.; and Wolley, E. Duane, to General Electric Company. Minority carrier isolation barriers for semiconductor devices. 3,988,762, Cl. 357-48.000.

Cline, Harvey E.; and Anthony, Thomas R., to General Electric Company. Deep diode solid state inductor coil. 3,988,764, Cl. 357-51.000.

Cline, Harvey E.: *See*—
Anthony, Thomas R.; and Cline, Harvey E., 3,988,766.
Anthony, Thomas R.; and Cline, Harvey E., 3,988,767.
Anthony, Thomas R.; and Cline, Harvey E., 3,988,768.
Anthony, Thomas R.; and Cline, Harvey E., 3,988,769.
Anthony, Thomas R.; and Cline, Harvey E., 3,988,770.

Clurman, Stanley Paul, to RCA Corporation. Reduction of hunting in synchronous motor. 3,988,653, Cl. 318-184.000.

Coates, Ralph L., to United States of America, Energy Research and Development Administration. Gasification of carbonaceous solids. 3,988,123, Cl. 48-73.000.

Coats, Carlton E.: *See*—
Watts, Golden F.; and Coats, Carlton E., 3,988,272.

Cocco, Eugene Raymond: *See*—
Bloxham, Gordon Foreman; Brezeale, Claude Paren; Cocco, Eugene Raymond; Hardesty, Edwin Charles; Small, Byron Lee; and Steinert, Daniel Marion, 3,988,092.

Cochran, Thomas Eugene; and Moring, Rodger Lloyd, to Caterpillar Tractor Co. Cleaning bar assembly for compactor wheels. 3,988,071, Cl. 404-129.000.

Coggin, Charles H., Jr., to Kaiser Glass Fiber Corporation. Assembly for the drawing of glass fibers. 3,988,135, Cl. 65-1.000.

Cohen-Solal, Gerard David; and Lussereau, Alain Gilles, to Societe Anonyme de Telecommunications. Process for producing a photodiode sensitive to infrared radiation. 3,988,774, Cl. 357-30.000.

Cole, James B., to Boeing Company, The. Trailing edge flaps having spanwise aerodynamic slot opening and closing mechanism. 3,987,983, Cl. 244-42.0DB.

Colgate-Palmolive Company: *See*—
Hernandez, John Michael; and Roberts, Karl H., 3,987,792.
Schaar, Charles H., 3,987,794.
Steltenkamp, Robert John, 3,988,432.

Collins, John J.: *See*—
Fornoff, Louis L.; Collins, John J.; and Reber, Raymond A., 3,988,129.

Collins, Robert F., to Kendall Company, The. Belt retainer. 3,987,518, Cl. 24-31.00R.

Columbia Chemical Corporation: *See*—
Rosenberg, William E., 3,988,219.

Commissariat a l'Energie Atomique: *See*—
Barriere, Jacques; and Robaglia, Michele, 3,988,224.
Blanc, Bernard; Boudou, Jean; Castaing, Alain; Clasquin, Jean; Gallet, Bernard; Saglio, Robert; and Samoel, Alain, 3,987,666.
Costes, Didier, 3,988,202.
Dubois, Jacques Emile; Lacaze, Pierre Camille; Le Gressus, Claude; and Massignon, Daniel, 3,988,222.

Communications Satellite Corporation (Comsat): *See*—
Sciulli, Joseph Albert, 3,988,674.
Smith, Lewis V., Jr.; and Miller, Norman P., 3,988,736.

Compagnie Honeywell Bull (Societe Anonyme): *See*—
Bottard, Gilles Jean Marcel; and Rottier, Marcel Rene, 3,988,579.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See*—
Filloux, Gerard, 3,988,718.

Computer Transceiver Systems, Inc.: *See*—
Kobryn, Ronald J., 3,987,882.

Condon, James A.; and Brenneman, G. Bruce, to Maxon Corporation. Valve actuating mechanism. 3,987,679, Cl. 74-2.000.

Congleton, Wayne, to Dolco Packaging Corporation. Container. 3,987,956, Cl. 229-28.00R.

Conner, John R. Tire storage and retrieval system and method. 3,987,915, Cl. 214-152.000.

Consolidated Foods Corporation: *See*—
Gravener, Roy Dennison, 3,987,539.

Consolidation Coal Company: *See*—
Gorin, Everett; Jasulaitis, William A.; Wasson, George E.; and Theodore, Frank William, 3,988,114.

Constant, James Nickolas. Synthetic aperture system for information transfer and object identification. 3,988,572, Cl. 235-61.11E.

Constantinescu, Dan: *See*—
Dorr, Karl-Heinz; Bielz, Siegfried; Constantinescu, Dan; Vollmer, Hubert; Beuchelt, Rudolf; Guth, Hans; Reher, Peter; and Wieschen, Herman, 3,988,428.

Container Corporation of America: *See*—
Johnson, Fred J., 3,987,957.

Conway, William H.: *See—*
McKenney, John D.; and Conway, William H., 3,987,659.
Conwed Corporation: *See—*
Larsen, Ronald Leslie; and Haffner, William Bela, 3,988,410.
Cooke, George H.; and Appleby, A. Edward. Hydraulic drive control system. 3,987,624, Cl. 60-431.000.
Cooley, Austin G. Illuminating and transmitting system. 3,988,537, Cl. 178-7.600.
Cooley, Richard F., to Owens-Illinois, Inc. Glass laser discs with annular alkali lead borate coatings and uses thereof. 3,988,697, Cl. 331-94.50E.
Cooper, David E. Device for removing liquid and similar matter from a surface. 3,987,514, Cl. 15-409.000.
Cooper, Glenn D.: *See—*
Bennett, James G.; and Cooper, Glenn D., 3,988,297.
Cooprider, Rex C.; Grogan, Richard P.; and Knickerbocker, Michael G., to Diamond International Corporation. Dispensing pump. 3,987,938, Cl. 222-209.000.
Copes, Joseph P.; and Randall, David I., to GAF Corporation. Low molecular weight complexes of lactams and polyhydroxy aromatic compounds. 3,988,318, Cl. 260-239.30R.
Copes, Joseph P.; and Randall, David I., to GAF Corporation. Low molecular weight substituted phenol-lactam-substituted phenol complexes from lactams and substituted monohydroxy phenolic compounds. 3,988,350, Cl. 260-326.5FL.
Copes, Joseph P.; and Randall, David I., to GAF Corporation. Complexes of polylactams and phenolic compounds. 3,988,351, Cl. 260-326.250.
Coplein, Gordon D.: *See—*
Shurgan, Joel; Northrop, Donald P.; and Coplein, Gordon D., 3,988,633.
Coppens, Matheus J. M., to Koninklijke Emballage Industrie Van Leer B.V. Pressure container. 3,987,923, Cl. 220-3.000.
Coratomic Inc.: *See—*
Purdy, David L.; Magovern, George J.; and Smyth, Nicholas P. D., 3,987,799.
Cornils, Boy: *See—*
Schnur, Friedrich; Hibbel, Josef; and Cornils, Boy, 3,988,117.
Corning Glass Works: *See—*
Rodgers, Harris G., Sr., 3,988,631.
Corompt, Antoine. Device for loading or unloading boxes or removable buckets, in particular for lorries. 3,987,918, Cl. 214-505.000.
Corompt, Antoine, to Bennes Marrel. Locking device, in particular for a handling cranked arm mounted on a vehicle. 3,988,035, Cl. 298-12.000.
Corrigan, Ara L., to Caterpillar Tractor Co. Fill and relief valve arrangement. 3,987,706, Cl. 91-432.000.
Corse, Louis, to Societe d'Etudes de Machines Speciales. Offset rotary presses. 3,987,726, Cl. 101-218.000.
Cosden Technology, Inc.: *See—*
Watson, James M., 3,988,212.
Costes, Didier, to Commissariat a l'Energie Atomique. Nuclear reactor of pressurized liquid coolant type. 3,988,202, Cl. 176-52.000.
Cottrell, Walter D., Jr.: *See—*
Clark, Jeri O.; Hankins, Bobby J.; and Cottrell, Walter D., Jr., 3,988,289.
Coucher, Robert G., to EPPCO. Powder feeder and methods for transporting particulate material. 3,987,937, Cl. 222-193.000.
Coulter Electronics, Inc.: *See—*
Hogg, Walter R., 3,988,128.
Coulter, Samuel T.; Morris, Howard A.; and Chappell, Rulon A., to University of Minnesota, The Regents of the. Cheese manufacture from molecular sieved milk. 3,988,481, Cl. 426-40.000.
Coutant, Ralph W., to Litton Systems, Inc. Impact absorbing idler roll assembly. 3,988,045, Cl. 308-20.000.
Coutin, Pierre F.: *See—*
Guimier, Jacques A.; and Coutin, Pierre F., 3,988,575.
Cowart, Brooks E., to Fairchild Camera and Instrument Corporation. Parametric tester for semiconductor devices. 3,988,672, Cl. 324-158.00R.
Cowder, Leo R.: *See—*
Umbarger, C. John; and Cowder, Leo R., 3,988,615.
Cox, Robert P.: *See—*
Barner, Herbert E.; Kust, Roger N.; and Cox, Robert P., 3,988,416.
Cozy, Michael J.: *See—*
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Craig, John A., to Texaco Trinidad, Inc. Composite multiple zone test tool. 3,987,847, Cl. 166-191.000.
Crane, Dale E.; Jones, Robert E.; and Meneses, Hector A., to Spectra-Physics, Inc. Plasma tube and method of manufacture. 3,988,698, Cl. 331-94.50D.
Crane, Walton B., to A & E Allied Plastics. Hanger stacking rack. 3,987,898, Cl. 206-300.000.
Creedon, John F.: *See—*
Vaughan, Robert W.; and Creedon, John F., 3,988,561.
Crooks, Donald Anderson: *See—*
Denny, Patrick John; and Crooks, Donald Anderson, 3,988,514.
Cross, Barrington, to American Cyanamid Company. Benzophenone ureas and method for utilizing the same. 3,988,300, Cl. 260-553.00A.
Cross, Barrington; and Walworth, Bryant Leonidas, to American Cyanamid Company. 3, or 5-Aminopyrazolium salts. 3,988,348, Cl. 260-311.000.
Croteau, Paul J., to Sylvester, David A., a part interest. Fixture for cutouts in drain troughs. 3,987,712, Cl. 90-11.00C.
Crowley, Thomas E.: *See—*
Ounsted, Edwin J.; Luzanski, George T.; Gardner, Robert W.; and Crowley, Thomas E., 3,988,079.
Crumley, J. A.: *See—*
Swengel, Robert Charles, Sr.; and Crumley, J. A., 3,988,563.
CSELT - Centro Studi e Laboratori Telecomunicazioni: *See—*
Dall'Olio, Cristiano; and Garetti, Enzo, 3,988,543.
CTP Industries, Inc.: *See—*
Kamins, Seymour; and Shapiro, Frederick M., 3,987,958.
CTS Corporation: *See—*
Van Benthuysen, John D.; and Flanders, Thomas W., 3,988,711.
Curtiss, Derry H.; and Heacock, Harold W., to United Nuclear Industries, Inc. Radwaste disposal by incorporation in matrix. 3,988,258, Cl. 252-301.10W.
Curtiss-Wright Corporation: *See—*
Roberts, Thomas C.; Jones, Charles; Lamping, Harold D.; and Myers, David M., 3,987,759.
Custom Research and Development, Inc.: *See—*
Leveskis, Newton George, 3,988,121.
Cutler-Hammer, Inc.: *See—*
Josemans, Leonardus J.; and Johnson, James V., Jr., 3,988,558.
Merker, George; Krupp, Joseph; Navi, Menashe; and Ward, Thomas A., 3,988,016.
Cutler, Royal A.; and Schalit, Samuel, to Sterling Drug Inc. Amidinoureas. 3,988,370, Cl. 260-553.00R.
Cyclecentric Corporation: *See—*
Roantree, William J., 3,987,682.
Czajlik nee Csizer, Eva: *See—*
Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik nee Csizer, Eva, 3,988,322.
Czubak, Albin Stanley, to Ex-Cell-O Corporation. Honing tool with reversible body sleeve. 3,987,591, Cl. 51-338.000.
Dahlgren, Shelley D., to United States of America, Energy Research and Development Administration. Method for preparing superconductors. 3,988,178, Cl. 148-133.000.
Dai Nippon Toryo Kabushiki Kaisha: *See—*
Yaguchi, Masachika; Jinnai, Toshio; Shirotsuka, Mikio; and Totani, Kazuo, 3,988,054.
Daihatsu Kogyo Company Limited: *See—*
Shimizu, Kenji; Nakaishi, Junzo; and Yamamoto, Kazuya, 3,988,083.
Daimler-Benz Aktiengesellschaft: *See—*
Peitsmeier, Karl, 3,988,574.
Dainippon Pharmaceutical Co., Ltd.: *See—*
Nishimura, Haruki; Uno, Hitoshi; Natsuka, Kagayaki; Shimokawa, Noriaki; Shimizu, Masanao; and Nakamura, Hideo, 3,988,456.
Daiwa Kasei Kabushiki Kaisha: *See—*
Nakaoji, Kozo, 3,988,344.
Dalal, Vikram Lalitchandra: *See—*
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Daley, Horace S.: *See—*
Vogts, William A.; and Daley, Horace S., 3,988,566.
Dall'Olio, Cristiano; and Garetti, Enzo, to CSELT - Centro Studi e Laboratori Telecomunicazioni. Inter-office signaling system for telecommunication network. 3,988,543, Cl. 179-15.0FD.
Damico, Ralph A.: *See—*
Peterson, Donald J.; Ward, James F.; and Damico, Ralph A., 3,988,144.
Daneshy, Abbas Ali, to Halliburton Company. Method of determining the relative fracturability of materials. 3,987,669, Cl. 73-88.00R.
Danne, Arthur J.; and Edwards, Richard A. System and apparatus for dental prophylaxis. 3,987,550, Cl. 32-59.000.
Danta, Randall C.: *See—*
McKinnon, Eugene T.; Drutz, Alvin S.; and Danta, Randall C., 3,988,709.
Darche, Michel Jean Paul: *See—*
Chaverebiere de Sal, Alain; Donnart, Rene Victor; and Darche, Michel Jean Paul, 3,987,745.
Darlington, Rex F. Force multiplying type archery bow. 3,987,777, Cl. 124-23.00R.
Darwin, Daniel P.; and Rex, Donald K., to International Business Machines Corporation. Ribbon lifting mechanism for a wire matrix printer. 3,987,883, Cl. 197-1.00R.
Datta, Ranajit K.: *See—*
White, John E.; and Datta, Ranajit K., 3,988,629.
Dauwalder, Fred R.: *See—*
Bland, James R.; and Dauwalder, Fred R., 3,987,687.
Davies, Arthur Gordon, to Medical & Electrical Instrumentation Company Limited. Direct voltage power supply apparatus. 3,988,611, Cl. 250-207.000.
Davis, Hubert Greenidge; Albright, Charles William; Potter, John Johnson, Jr.; and Strick, Carl Edwin, to Union Carbide Corporation. Integrated coal hydrocarbonization and gasification of char. 3,988,237, Cl. 208-8.000.
Davis, Hubert Greenidge: *See—*
Albright, Charles William; and Davis, Hubert Greenidge, 3,988,236.
Dawdy, Jack A.; and Buergin, Rodney G., to National Gypsum Company. Removable wallboard tie. 3,987,595, Cl. 52-127.000.
Day, Ray E. Piston. 3,987,709, Cl. 92-232.000.
Dayco Corporation: *See—*
Fisher, David G.; and Speer, Billy L., 3,987,684.
Holden, Homer N.; Hunt, James P.; Browning, Vernon D.; Hoglen, Edward L.; and Kleykamp, Donald L., 3,988,409.

Deards, Henry Charles; and Pickford, Nigel Evans, to Imperial Chemical Industries Limited. Plastics carrier-bag. 3,987,959, Cl. 229-54.00R.

de Boer, Geert, to Stork Amsterdam B.V. Filling cheese moulds with a curd portion. 3,988,090, Cl. 425-84.000.

Dechantsreiter, Max J., to Harnischfeger Corporation. Overhead crane including grapple means. 3,987,905, Cl. 212-18.000.

Dedieu, Robert: *See—*
Humbert, Francoise Ernestine Lucie; and Dedieu, Robert, 3,988,435.

Deen, Darrel B.; Hrdy, James E.; and Schnurr, Michael W., to American Equipment Corporation. Quick connect snow plow implement. 3,987,562, Cl. 37-42.00R.

Deere & Company: *See—*
Gassman, Max Paul, 3,987,628.
Hunck, Billie Gene; and Kress, James Henry, 3,987,768.
Lindstrom, Harold Richard, 3,987,627.
VanDerZyl, Roger Dale; McMullen, Larry Gene; and Kraske, Leroy Ernest, 3,987,914.
Welck, Arnold Emil, 3,987,766.

Dehmel, Georg: *See—*
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Del Corso, Gregory J.: *See—*
Esposito, David; Reiter, Raymond A.; and Del Corso, Gregory J., 3,988,084.

Della Pella, Joseph A. Tire mounting kit. 3,987,947, Cl. 224-42.060.

Delonnay, Jean H. Apparatus for coating confectionery such as chocolates or biscuits. 3,987,751, Cl. 118-24.000.

Del Paggio, Anthony F.; and Balzer, Norbert R., to Park-Ohio Industries, Inc. Method and apparatus for inductively heating elongated workpieces. 3,988,179, Cl. 148-153.000.

DeMusis, Ralph T. Machine for resurfacing turbine vanes. 3,988,126, Cl. 51-100.00R.

Denham, Dan Franklin; and Biggs, Lawrence Gerald, to Tektronix, Inc. Controlled storage level for a storage cathode-ray tube. 3,988,634, Cl. 315-13.0ST.

Denisart, Jean-Paul; Edney, Barry E.; and Lemcke, Bo, to Institut Cerac SA. Method of breaking a hard compact material, means for carrying out the method and application of the method. 3,988,037, Cl. 299-16.000.

Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Dohi, Michio; Sumida, Takuji; and Yokobori, Katsuichi, 3,988,506.

Denning, Richard; and Einthoven, Willem Gerard, to RCA Corporation. Thermally balanced PN junction. 3,988,759, Cl. 357-36.000.

Denny, Patrick John; and Crooks, Donald Anderson, to Imperial Chemical Industries Limited. Catalytic material. 3,988,514, Cl. 427-239.000.

Dentsply Research & Development Corporation: *See—*
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Derible, Pierre Henri; Lavaux, Jean-Paul; and Laurent, Jacques, to Roussel-UCLAF. Novel phenothiazines as neuroleptics. 3,988,453, Cl. 424-247.000.

Desio, Frank B.: *See—*
Sidor, Edward Frank; and Desio, Frank B., 3,988,710.

De Smedt, Frans Antoon: *See—*
Jeurissen, Lambert Gaston; and De Smedt, Frans Antoon, 3,988,301.

Desnos, Monique: *See—*
Malen, Charles; Desnos, Monique; Laubie, Michel; and Poignant, Jean-Claude, 3,988,464.

Deutsche Texaco Aktiengesellschaft: *See—*
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Grasshoff, Hans Dieter, 3,988,248.

DeVries, Adrian J., to Zenith Radio Corporation. Acoustic surface wave device having split-isolated or split-connected multistrip coupler. 3,988,703, Cl. 333-72.000.

De Vrieze, Christiaan G., to Stamicarbon B.V. Process for the addition of additives to thermoplastics. 3,988,285, Cl. 260-33.6PQ.

Dewey, C. Forbes, Jr., to Massachusetts Institute of Technology. Nonlinear amplifying. 3,988,593, Cl. 307-88.300.

Dexter, Martin: *See—*
Spivack, John D.; and Dexter, Martin, 3,988,363.

Deyoe, Charles W.; and Bartley, Erle E., to Kansas State University Research Foundation, The. Liquid starch-urea ruminant feed and method of producing same. 3,988,483, Cl. 426-53.000.

Diamond, Herrick R., to SCM Corporation. Automatic single and repeat function mechanism for typewriters. 3,987,885, Cl. 197-91.000.

Diamond International Corporation: *See—*
Cooprider, Rex C.; Grogan, Richard P.; and Knickerbocker, Michael G., 3,987,938.

Di Bella, Eugene P., to Tenneco Chemicals, Inc. Process for the preparation of substituted indazoles. 3,988,347, Cl. 260-310.00C.

Dieckelmann, Gerhard; Plapper, Jurgen; Baumann, Horst; and Stein, Werner, to Henkel & Cie G.m.b.H. Sulfonated lubricating agents for leather and furs and process. 3,988,247, Cl. 252-8.700.

Diehl, Karl-Heinz: *See—*
Eggensperger, Heinz; and Diehl, Karl-Heinz, 3,988,452.

Diesel Kiki Co., Ltd.: *See—*
Takada, Haruhiko, 3,988,080.

Dietch, Leonard, to Zenith Radio Corporation. Black-surround color picture tube. 3,988,632, Cl. 313-408.000.

Dieterich, Dieter: *See—*
Dietrich, Werner; Reiff, Helmut; and Dieterich, Dieter, 3,988,268.

Dietrich, Werner; Reiff, Helmut; and Dieterich, Dieter, to Bayer Aktiengesellschaft. Polyurethane foam plastics which contain ionic groups. 3,988,268, Cl. 260-2.5AN.

Digital Equipment Corporation: *See—*
Leis, Michael D.; Stockebrand, Thomas C.; and Benson, Wilfred Y., 3,988,779.

Dill, Harold T.: *See—*
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Di Rubio, Robert L.: *See—*
Adams, Herbert J. F.; Anderson, Jon C.; Blair, Murray R., Jr.; Di Rubio, Robert L.; and Takman, Bertil H., 3,988,473.

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DiToro, Michael J., to General Signal Corporation. System for audibly recognizing an aurally unclassifiable signal. 3,988,546, Cl. 179-15.55T.

Dixon, Dale D.; and Hayes, Larry J., to Air Products and Chemicals, Inc. Fluorination of polyesters and polyamide fibers. 3,988,491, Cl. 428-288.000.

Dixon, William Ross; and Wood, Alexander, to Hoffmann-La Roche Inc. Immunoassay of antipyrine. 3,988,430, Cl. 424-1.500.

Dr. W. Killer AG: *See—*
Killer, Walter Heinz Peter, 3,988,591.

Dodenhoff, John A. Hermetic terminal. 3,988,053, Cl. 339-278.00C.

Doherty, William F., to Pyrotector, Incorporated. Detector system. 3,988,725, Cl. 340-228.00R.

Dohi, Michio; Sumida, Takuji; and Yokobori, Katsuichi, to Denki Kagaku Kogyo Kabushiki Kaisha. Process for producing chloroprene elastomer. 3,988,506, Cl. 526-218.000.

Dolco Packaging Corporation: *See—*
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Dollfus Mieg & Cie: *See—*
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Donaldson Company, Inc.: *See—*
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Donnart, Rene Victor: *See—*
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Dorhofer, Gunther; Heckendorn, Roland; Schmid, Erich; Storni, Angelo; and Zust, Armin, to Ciba-Geigy Corporation. Aminoacyl compounds. 3,988,467, Cl. 424-274.000.

Dornier System GmbH: *See—*
Kook, Dieter, 3,987,981.

Dorr, Karl-Heinz; Bielz, Siegfried; Constantinescu, Dan; Vollmer, Hubert; Beucheit, Rudolf; Guth, Hans; Reher, Peter; and Wieschen, Herman, to Metallgesellschaft Aktiengesellschaft. Sulfur-producing process and system for producing sulfur dioxide. 3,988,428, Cl. 423-543.000.

Dow Chemical Company, The: *See—*
Abdallah, Abdulmuniem H.; and Shea, Philip J., 3,988,474.
Bethea, James R.; Bryan, Robert G., Jr.; and Stain, S. Douglas, Jr., 3,988,296.
Jahn, Robert G., 3,988,500.
Robbins, Lanny A., 3,988,116.

Downs, Gordon L.; and Mecham, Woodrow W. Auxiliary heater for a gas-fired water heater. 3,987,761, Cl. 122-20.00B.

Dowty Mining Equipment Limited: *See—*
Tristram, William Francis, 3,987,908.

Drakaliski, Boris Yordanov: *See—*
Vitanov, Yordan Ivanov; Yordanov, Boris Petrov; Mihovski, Kalcho Minkov; and Drakaliski, Boris Yordanov, 3,987,844.

Drapac, Michael J., to Rockwell International Corporation. Balanced four-way power divider employing 3db, 90° couplers. 3,988,705, Cl. 333-10.000.

Dreikorn, Barry A., to Eli Lilly and Company. Ditetrazolo[1,5-a:5',1'-c]quinoxalines for control of soil-borne phytopathogens. 3,988,455, Cl. 424-250.000.

Dresser Industries, Inc.: *See—*
Canterbury, Robert Houston, 3,987,848.
Lichte, Carl Laurent, 3,987,859.
Reese, Anthony L., 3,988,000.

Dreyer, Dennis G.; Foley, Edward M.; and Rogers, Herbert E., Jr., to Cabot Corporation. Powder metallurgy compacts and products of high performance alloys. 3,988,524, Cl. 428-403.000.

Drozdov, July Prokofievich: *See—*
Naratov, Alexei Mikhailovich; Legostaev, Valery Leonidovich; Gusev, Boris Sergeevich; Nadzharov, Oleg Eduardovich; Osipov, Valentin Ivanovich; Anisimov, Viktor Vasilievich; Muratov, Enver Osmanovich; Tarasov, Ivan Ivanovich; Badenkov, Petr Fedorovich; Kepersha, Ljudvig Mikhailovich; Ionov, Valentin Alexandrovich; Drozdov, July Prokofievich; Shvets, Grigory Iosifovich; Kruglov, Ivan Ivanovich; and Leontiev, Mikhail Dmitrievich, 3,988,077.

Drutz, Alvin S.: *See—*
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DSO "Metalurgia i Rudodobiv": *See—*
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DSO "Pharmachim": *See—*
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Dubinsky, Rudolf Solomonovich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Latash, Jury Vadimovich; Chekotilo, Leonty Vasilievich; Baglai, Vitaly Mikhailovich; Artamonov, Viktor Leonidovich; Garkaljuk, Rodimir

Ivanovich; Timchenko, Viktor Anatolievich; Malichenko, Evgeny Fedorovich; Stupak, Leonid Mikhailovich; and Dubinsky, Rudolf Solomonovich, 3,987,843.

Dubois, Jacques Emile; Lacaze, Pierre Camille; Le Gressus, Claude; and Massignon, Daniel, to Commissariat a l'Energie Atomique; and Agence Nationale de Valorisation de la Recharche (ANVAR). Method of fabrication of electroemissive components. 3,988,222, Cl. 204-38.00S.

Duchenois, Valere Dominique Louis: *See—*
Eschard, Gilbert; and Duchenois, Valere Dominique Louis, 3,987,522.

Dudas, Antal: *See—*
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Platz, Rolf; Fuchs, Werner; and Dudeck, Christian, 3,988,379.

Dullinger, Karl, to Kronseder, Hermann. Stacked label package and method of making it. 3,987,901, Cl. 206-451.000.

Dulog, Lothar G., to S.A. Texaco Belgium N.V. Hydration method and catalyst. 3,988,381, Cl. 260-641.000.

Dumas, David H.: *See—*
Aldrich, Paul H.; and Dumas, David H., 3,988,280.

Dunlap, Daniel. Adjustable bow guide. 3,987,700, Cl. 84-283.000.

Dunn, George L., to SmithKline Corporation. α-Amino-α-(acylamidophenyl)acetamidocephalosporins. 3,988,451, Cl. 424-246.000.

Du Pont de Nemours, E. I., and Company: *See—*
Ballard, Edward Cooper; and Priest, John Ricks, 3,988,509.
Ferretti, August, 3,988,252.
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Duro-Test Corporation: *See—*
Shurgan, Joel; Northrop, Donald P.; and Coplein, Gordon D., 3,988,633.

Dustmann, Cord-Henrich; Zernial, Wolfgang; Krauth, Helmut; and Suss, Edmund, to Gesellschaft fur Kernforschung m.b.H. Electron source. 3,988,627, Cl. 313-309.000.

Dykas, George Edward, to Motorola, Inc. Transmit-receive switching circuit with audio muting. 3,988,675, Cl. 325-18.000.

E.G. Larssons Hardmetall AB: *See—*
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E M B A D A C: *See—*
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Eagle Manufacturing Company: *See—*
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Eastland, Dorothy A.: *See—*
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Eastland, William C., executor: *See—*
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Eastman Kodak Company: *See—*
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Irick, Gether, Jr.; Kelly, Charles A.; and Martin, James C., 3,988,295.
McNair, David D.; and Schubert, Alvin L., 3,988,063.
Miller, Howard A.; Smith, Kenneth L.; and Stacy, Peter M., 3,987,728.
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Pacifici, James G.; and Newland, Gordon C., 3,988,229.
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Eastman, Larry B.; and Kenigsberg, Irwin J., to United Technologies Corporation. Spherical bifilar tuning pin bushing. 3,988,073, Cl. 416-145.000.

Eatock, Fred L., to Fairchild Camera and Instrument Corporation. High-gain differential input comparator with emitter feedback input hysteresis. 3,988,595, Cl. 307-235.00F.

Eaton Corporation: *See—*
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Eckenhoff, James Benjamin; Johnson, Neil Arthur; and Yum, Su Il, to Alza Corporation. Osmotically driven fluid dispenser. 3,987,790, Cl. 128-260.000.

Ecker, Karl; Richter, Ingeborg; and Mayrhofer, Max, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Method of producing cold rolled, silicon-alloyed electric sheets. 3,988,177, Cl. 148-111.000.

Edmonds, James T., Jr.; and Hill, Harold Wayne, Jr., to Phillips Petroleum Company. Heat curable poly(arylene sulfide) compositions. 3,988,286, Cl. 260-37.00R.

Edney, Barry E.: *See—*
Denisart, Jean-Paul; Edney, Barry E.; and Lemcke, Bo, 3,988,037.

Edwards, Glenn R.; and Imhoff, Howard J. Coke oven air regulating assembly. 3,988,105, Cl. 431-121.000.

Edwards, Richard A.: *See—*
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Eggensperger, Heinz; and Diehl, Karl-Heinz, to Sterling Drug Inc. Preserving and disinfecting composition. 3,988,452, Cl. 424-246.000.

Eggermont, Ludwig Desire Johan, to U.S. Philips Corporation. Digital filter device for processing binary-coded signal samples. 3,988,606, Cl. 235-156.000.

Eggermont, Ludwig Desire Johan; Van Essen, Hendrik Arie; Van Gerwen, Petrus Josephus; and Snijders, Wilfred Andre Maria, to U.S. Philips Corporation. Interpolating digital filter. 3,988,607, Cl. 235-156.000.

Egyt Gyogyszervegyeszeti Gyar: *See—*
Kosoczky, Ibolya; Budai, Zoltan; Kosa, Laszlo; and Petocz, Lujza, 3,988,461.

Einthoven, Willem Gerard: *See—*
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Eldred, Roger J., to General Motors Corporation. Oil-resistant EPDM elastomer. 3,988,227, Cl. 204-159.170.

Elghani, Salah Elabd: *See—*
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Ellis, Alfred Brian Edwin, to Marconi Company Limited, The. Television transmission. 3,988,529, Cl. 178-6.000.

Elwood, Albert A. Method of and system for locating a position. 3,988,734, Cl. 343-112.00R.

Emery Industries, Inc.: *See—*
Foulks, Harold C., Jr.; Rodenberg, Herbert G.; and Mains, Harold E., 3,988,330.

Emil, Tuncay, to American Hospital Supply Corporation. System for computing cardiac flow rates from thermodilution measurements. 3,987,788, Cl. 128-2.05F.

Endo, Keiji: *See—*
Susuki, Rinnosuke; Toyoda, Sadao; and Endo, Keiji, 3,988,218.

Endo, Takeshi; Mitsui, Yoshihiro; and Kamakura, Hiroshi, to Kabushiki Kaisha Suwa Seikosha; and Shinshu Seiki Kabushiki Kaisha. Stabilized brushless motor drive circuit. 3,988,652, Cl. 318-138.000.

Endyn Industries Ltd.: *See—*
Murphy, Arthur John; and Maddocks, Ray Charles, 3,988,570.

Energy Conversion Devices, Inc.: *See—*
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Engeler, William E.; and Tiemann, Jerome J., to General Electric Company. Self-registered surface charge receive and regeneration devices and methods. 3,988,773, Cl. 357-24.000.

Engelhardt, Achim: *See—*
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Engelsmann, Dieter: *See—*
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Engineering Dynamics Corporation: *See—*
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Engle, James L., to Borg-Warner Corporation. Speed-sensitive differential mechanism. 3,987,689, Cl. 74-711.000.

Engstrom, Anders: *See—*
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Ensign-Bickford Company, The: *See—*
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Spraggs, Richard William; and Gladden, Ernest Laird, 3,987,733.

Enterprise Brass Works: *See—*
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EPPCO: *See—*
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Eprad Incorporated: *See—*
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Erico Rail Products Company: *See—*
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Erie Technological Products, Inc.: *See—*
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Ernst Leitz G.m.b.H.: *See—*
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ESB Incorporated: *See—*
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Eschard, Gilbert; and Duchenois, Valere Dominique Louis, to U.S. Philips Corporation. Method of manufacturing an image display device incorporating proximity focussing. 3,987,522, Cl. 29-25.180.

Esposito, David; Reiter, Raymond A.; and Del Corso, Gregory J., to Carpenter Technology Corporation. Atomizing nozzle assembly for making metal powder and method of operating the same. 3,988,084, Cl. 425-7.000.

Etat Francais: *See—*
Guillou, Rene F.; and Fouche, Yves F., 3,988,605.

Etat Francais represente par le Deleque Ministeriel pour l'Armement: *See—*
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Ethicon, Inc.: *See—*
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Ethyl Corporation: *See—*
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Euverard, Maynard R.; and Heide, Henry A., to Velten & Pulver, Inc. Self-aligning apparatus for stacker-unstacker elevator. 3,987,911, Cl. 214-8.50A.

Evans, Dennis Ernest Mackley; and Hendy, Brian Norman, to Imperial Chemical Industries Limited. Polymerization process. 3,988,505, Cl. 526-59.000.

Evans, Joseph H., to Raychem Corporation. Heat recoverable articles and methods therefor. 3,988,399, Cl. 264-22.000.

Evans, Lee D., to Outboard Marine Corporation. Grass clipping collection apparatus. 3,987,606, Cl. 56-13.400.

Evenson, Raymond M., to Applied Power Inc. Pipe bending apparatus. 3,987,656, Cl. 72-154.000.

Everest & Jennings, Inc.: *See—*
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Evers, William J.; Heinsohn, Howard H., Jr.; Vock, Manfred Hugo; and Giacino, Christopher, to International Flavors & Fragrances Inc. 3-Furyl sulfides and foodstuff flavor compositions comprising same. 3,988,510, Cl. 426-535.000.

Evers, William J.: *See—*
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Ex-Cell-O Corporation: *See—*
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Exchem Holdings Limited: *See—*
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Exxon Production Research Company: *See—*
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Goto, Toshio, to Fuji Photo Film Co., Ltd. Grip means for auto-process camera. 3,988,751, Cl. 354-82.000.

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Gottschlich, Rudolf: *See—*
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Grasshoff, Hans Dieter, to Deutsche Texaco Aktiengesellschaft. Lithium soap lubricating grease. 3,988,248, Cl. 252-18.000.

Gravener, Roy Dennison, to Consolidated Foods Corporation. Method of making a molded commutator. 3,987,539, Cl. 29-597.000.

Green, Samuel I.: *See—*
Rice, Robert R.; Nettle, Victor H.; Allen, Louis B.; and Green, Samuel I., 3,988,704.

Greenbaum, George. Modular channel culture device. 3,987,585, Cl. 47-34.130.

Grier, David G.: *See—*
Bohenek, Leonard J.; and Grier, David G., 3,987,821.

Grierson, Robert; and Larsen, Earl L., to P. R. Mallory & Co., Inc. Tungsten-nickel-iron-molybdenum alloys. 3,988,118, Cl. 29-182.000.

Griffin, Edward T., to Bendix Corporation, The. Micro-programming fault analyzer. 3,988,603, Cl. 235-153.0AC.

Grihangne, Andre. Ground-reaction machines. 3,987,866, Cl. 180-128.000.

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Griso-Chemie AG: *See—*
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Grogan, Richard P.: *See—*
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Gryctko, Carl E., to I-T-E Imperial Corporation. Method of forming a crimp-type electrical connector. 3,987,540, Cl. 29-630.00A.

GTE Automatic Electric Laboratories Incorporated: *See—*
Waldeck, Gary C., 3,988,548.
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GTE International Incorporated: *See—*
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GTE Sylvania Incorporated: *See—*
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Gubner, Richard S.: *See—*
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Height, Frank S.; and Guille, Frank S., 3,987,904.

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Reiss, Martin H.; and Solomon, Elias E., 3,988,726.

Gunby, Leslie, to PPG Industries, Inc. Process for electrolyzing brine in a bipolar electrolytic diaphragm cell having friction welded conductor connector means. 3,988,220, Cl. 204-98.000.

Gusev, Boris Sergeevich: *See—*
Naratov, Alexei Mikhailovich; Legostaev, Valery Leonidovich; Gusev, Boris Sergeevich; Nadzharov, Oleg Eduardovich; Osipov, Valentin Ivanovich; Anisimov, Viktor Vasilievich; Muratov, Enver Osmanovich; Tarasov, Ivan Ivanovich; Badenkov, Petr Fedorovich; Kepersha, Ljudvig Mikhailovich; Ionov, Valentin Alexandrovich; Drozdov, July Prokofievich; Shvets, Grigory Iosifovich; Kruglov, Ivan Ivanovich; and Leontiev, Mikhail Dmitrievich, 3,988,077.

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Nozik, Arthur Jack; and Haacke, Gottfried, 3,987,781.

Haagens, Robert G.; and Lautzenhiser, Argyle, to Laitram Corporation, The. Gyroscopic system and method of determining direction. 3,987,555, Cl. 33-324.000.

Haas, Edgar; and Kottsieper, Edward, to Herman Schwabe Industries. Die press with movable die carriage having controls thereon. 3,987,696, Cl. 83-532.000.

Hackstein, Karl-Gerhard; and Hrovat, Milan, to Nukem G.m.b.H. Pressed block fuel elements for gas cooled high temperature power reactors and processes for their production. 3,988,397, Cl. 264-.500.

Haffner, William Bela: *See—*
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Haglof, Borje. Wardrobes. 3,987,946, Cl. 224-42.46A.

Haining, Frank W.; Rubino, Robert V.; and Wiley, Robert T., to International Business Machines Corporation. Stabilization of printed circuit board core laminates. 3,988,408, Cl. 264-156.000.

Hajos, Gyorgy: *See—*
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Halasa, Adel Farhan, to Firestone Tire & Rubber Company, The. Catalysts for the hydrogenation of unsaturated hydrocarbon polymers. 3,988,504, Cl. 526-25.000.

Halbrook, Thurman P., to Tennis Machines, Inc. Racket stringing machine. 3,988,022, Cl. 273-73.00A.

Haldor Topsoe A/S: *See—*
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Hall, Gerald D., to Caterpillar Tractor Co. Flow responsive poppet relief valve. 3,987,814, Cl. 137-469.000.

Hall, John B.; Tseng, Ching Y.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., to International Flavors & Fragrances Inc. Novel process for altering the organoleptic properties of tobacco using 2-methyl-4-pentenoic acid and the ethyl esters thereof. 3,987,803, Cl. 131-17.00R.

Hall, Matthew, to Everest & Jennings, Inc. Pressure distribution pad assembly for wheelchairs. 3,987,507, Cl. 5-338.000.

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Hamade, Adib R.: *See—*
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Hamamatsu Terebi Kabushiki Kaisha: *See—*
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Hamasaki, Leslie T. Display device. 3,987,995, Cl. 248-450.000.

Hameister, Walter: *See—*
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Hammann, Ingeborg: *See—*
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Hampshire, William J., to Goodyear Tire & Rubber Company, The. Apparatus for manufacturing curved bodies of fiber reinforced plastic. 3,988,089, Cl. 425-82.000.

Hanka, Ladislav J.; and Wiley, Paul F., to Upjohn Company, The. Antibiotic U-43,120 and process for preparing same. 3,988,441, Cl. 424-117.000.

Hankins, Bobby J.: *See—*
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Hansen, John V. E., to United States of America, Army. Nondestructive test method for assessing textile material degradation. 3,987,665, Cl. 73-67.200.

Hansen, Kenneth N., to Allis-Chalmers Corporation. Range shift and park lock control. 3,987,878, Cl. 192-4.00A.

Hansen, Per Loubaerg, to National Research Development Corporation. Ultrasonic transducer devices. 3,987,673, Cl. 73-194.00A.

Hansford, Rowland C., to Union Oil Company of California. Thermally stable coprecipitated catalysts useful for methanation and other reactions. 3,988,263, Cl. 252-466.00J.

Hansl, Nikolaus R. Meta-[2-(benzylamino)-ethyl] benzoic acid amides. 3,988,371, Cl. 260-558.00A.

Hanson, Wallace E., to Champion International Corporation. Display carton and blank therefor. 3,987,893, Cl. 206-45.140.

Hara, Atsushi; Hayashi, Hideo; and Ohtomo, Sigeru, to Nippon Kokan Kabushiki Kaisha. Fluid leakage detection apparatus. 3,987,662, Cl. 73-40.50R.

Harada, Hiroshi: *See—*
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Hardee, Dicky D., to Story Chemical Corporation. Boll weevil trap. 3,987,577, Cl. 43-121.000.

Hardesty, Edwin Charles: *See—*
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Hareng, Michel; and Le Berre, Serge, to Thomson-CSF. Liquid-crystal display method and information-processing apparatus applying this method. 3,988,056, Cl. 350-160.0LC.

Harlan, James T., Jr., to Shell Oil Company. Hydroxylated and chlorinated block laminates and their preparation. 3,988,394, Cl. 260-880.00B.

Harley Corporation: *See—*
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Harman, Randall W., to Nucleonic Data Systems, Inc. Blown film thickness gauge. 3,988,582, Cl. 250-272.000.

Harnischfeger Corporation: *See—*
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Harper, John Martin: *See—*
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Harrison, Christopher Roland, to Westinghouse Brake & Signal Company Limited. Pneumatic level sensing. 3,987,675, Cl. 73-302.000.

Harrison, Douglas S.; and Koehler, Albert M., to Brown & Root, Inc. Methods and apparatus for installing a drill conductor from an offshore tower. 3,987,639, Cl. 61-86.000.

Harrison, Ian T.: *See—*
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Harrison, Tony; and Weatherhead, Roger G., to Shell Oil Company. Epoxy resin accelerator. 3,988,257, Cl. 252-182.000.

Harrow, Geoffrey A.; Mills, Walter D.; Wilson, John L.; and Finlay, Ian C., to Shell Oil Company. Liquid fuel vaporizing device for internal combustion engines. 3,987,773, Cl. 123-122.0AA.

Hart, Charles Richard; and Nield, Eric, to Imperial Chemical Industries Limited. Transparent rubber-containing blend of acrylonitrile/aromatic olefin resin. 3,988,391, Cl. 260-876.00R.

Hartfiel, Arlynn H., to Chemical Additives Company. Clay-free thixotropic wellbore fluid. 3,988,246, Cl. 252-8.50A.

Hartmann, Jack P. Plumbing fixture for penal institution. 3,987,502, Cl. 4-75.000.

Haruta, Hisae: *See—*
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Hasfjord, Morten Birger, to E.G. Larssons Hardmetall AB. Rotary cutter. 3,987,525, Cl. 29-105.00R.

Hashimoto, Hiroshi; Suga, Kiyomitsu; and Shimizu, Toshio, to Kabushiki Kaisha Seikosha. Case-hardening method for carbon steel. 3,988,515, Cl. 427-249.000.

Hashimoto nee Matui, Akira: *See—*
Nakanishi, Kazuo; Iwata, Takashi; Haruta, Hisae; Yoshida, Kazuhiko; Yagi, Hideo; and Hashimoto nee Matui, Akira, 3,988,373.

Hasler, Rolf: *See—*
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Hass, Hyman; and Murphy, Terrence P., to Applied Fluidics, Inc. Dry-testing system for detecting leaks in containers. 3,987,664, Cl. 73-49.200.

Hauf, Robert Conrad: *See—*
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Hayosh, Thomas D.; and Carosella, John H., to Schiller Industries, Inc. Three line scanner for bar code symbols. 3,988,573, Cl. 235-61.11E.

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Heck, Richard F., to University of Delaware, The. Process for the preparation of carboxylic acid esters from organic halides. 3,988,358, Cl. 260-465.00D.

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Hedlund, Raymond J., to FDI, Inc. Universal wheel system. 3,988,038, Cl. 301-9.0DN.

Hegar, Gert, to Ciba-Geigy AG. Basic azo dyestuffs containing a heterocyclic diazo component and a para-N-tertiary or quaternary heterocyclic amine alkylene amino benzene coupling component. 3,988,311, Cl. 260-158.000.

Hehl, Karl. Machine base with hydraulic controls for injection molding machine. 3,988,099, Cl. 425-242.00R.

Heide, Henry A.: *See—*
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Height, Frank S.; and Guille, Frank S. Storage of articles. 3,987,904, Cl. 211-105.100.

Hein, Leopold A.; and Myers, William N., to United States of America, National Aeronautics and Space Administration. Mechanical thermal motor. 3,987,630, Cl. 60-527.000.

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Heller, Laszlo; Forgo, Laszlo; and Frank, Gyorgy, to Transelektro Magyar Villamossagi Kulkereskedelmi Vallalat. Method and apparatus for cooling heat engines. 3,987,631, Cl. 60-690.000.

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Henrion, W. S., to Texas Instruments Incorporated. Thermal printhead with memory. 3,988,569, Cl. 219-216.000.

Hentschel, Michael; and Unterweger, Heinz, to Sprecher & Schuh AG. Phase breakdown- and null current-detector, especially for an electronic motor protection relay possessing current-dependent triggering. 3,988,641, Cl. 317-13.00B.

Heraeus-Christ GmbH: *See—*
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Herchner, Dieter, to Licentia Patent-Verwaltungs-G.m.b.H. Electronic cut out for a circuit to be protected. 3,988,642, Cl. 317-27.00R.

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Herman, Calvin F., to United States of America, National Aeronautics and Space Administration. Differential pulse code modulation. 3,988,729, Cl. 340-347.0DD.

Herman Schwabe Industries: *See—*
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Hermann Berstorff Maschinenbau GmbH: *See—*
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Herminghaus, Hellmut; and Jablonka, Dieter, to Ewald Dorken AG. Tarpaulin with edge reinforcing strip. 3,987,592, Cl. 52-3.000.

Hernandez, John Michael; and Roberts, Karl H., to Colgate-Palmolive Company. Disposable diaper having improved liquid retention. 3,987,792, Cl. 128-284.000.

Herold, Robert Andrew, to United Technologies Corporation. Graphite forging die. 3,987,658, Cl. 72-342.000.

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Hertz, Helmuth; and Meyer, Rudolf, to AGFA-Gevaert, A.G. Apparatus for depositing liquid droplets on a moving receiving surface. 3,988,740, Cl. 346-75.000.

Hertz, Jerome Jay, to Erie Technological Products, Inc. Monolithic ceramic capacitor. 3,988,651, Cl. 317-258.000.

Hesse, Wolfgang; and Moller, Gisbert, to Hoechst Aktiengesellschaft. Synthetic resins. 3,988,386, Cl. 260-831.000.

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Hibbel, Josef: *See—*
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Hibbert, Harry Russell; and Broadbent, John Edward Alexander, to Mars Limited. Meat-like protein food and method of making. 3,988,485, Cl. 426-104.000.

Hickey, Wilma Jayne. Restraining device. 3,987,505, Cl. 5-336.000.

Hickman, Henry H.; Kalke, Avinash R.; Lach, Walter; and Myscofski, Ronald F., to Western Electric Company, Inc. Automated positioning. 3,988,535, Cl. 178-6.800.

Higashiyama, Tatsuo; and Sakata, Isao, to Toyo Hakka Kogyo Kabushiki Kaisha. Menthol glycoside, process for preparing the same and method for releasing menthol therefrom. 3,988,482, Cl. 426-48.000.

Hilbert, Edward E.: *See—*
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Hill, Alton V., Jr., to Whisnant, Hal Franklin, a part interest. Process of forming yarns from gin motes. 3,987,615, Cl. 57-156.000.

Hill, Eugene F., to Varian Associates. Nuclear reactor fuel rod thermal simulator. 3,988,565, Cl. 219-121.00R.

Hill, Geraldine A., to Raymond Lee Organization, Inc., The. No drip pie plate. 3,987,720, Cl. 99-433.000.

Hill, Harlan F.; and Lafferty, John J., to SmithKline Corporation. Novel compounds and compositions for treating Parkinson's disease. 3,988,457, Cl. 424-250.000.

Hill, Harold Wayne, Jr.: *See—*
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Hill, Harry Elwyn, to R. T. Vanderbilt Company, Inc. Surface coating compositions containing antimicrobic ureas. 3,988,294, Cl. 260-45.80N.

Hill, Theodore B., to Westinghouse Air Brake Company. Continual quick service valve device with fast charging means. 3,988,044, Cl. 303-82.000.

Hillmer, Roy Wayne; Morrone, Nicholas Francis; and Slahetka, Chester Robert, to Johns-Manville Corporation. Perlite insulation board and method of making the same. 3,988,199, Cl. 162-101.000.

Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsion. 3,988,155, Cl. 96-69.000.

Hines, John H., to Potlatch Corporation. Wood paneling. 3,987,599, Cl. 52-589.000.

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Hirozawa, Koichiro: *See—*
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Katayama, Hajime; Torigai, Akiyoshi; and Onoda, Shigeyoshi, to Canon Kabushiki Kaisha. Developing device. 3,987,756, Cl. 118-637.000.

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Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik nee Csizer, Eva, to Richter Gedeon Vegyeszeti Gyar Rt. Steroids effective against heavy-metal poisoning. 3,988,322, Cl. 260-239.570.

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Kelly, Charles A.: *See—*
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Kemp, Dennis E., Jr. Self-compensating rotary seal member. 3,988,026, Cl. 277-4.000.

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Kian, Leonard. Cooking utensil. 3,987,719, Cl. 99-422.000.

Kichiji, Hiroshi: *See—*
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Kienle, Max, to Tesa S.A. Apparatus for measuring continuous or discontinuous surfaces. 3,987,551, Cl. 33-169.00R.

Killer, Walter Heinz Peter, to Dr. W. Killer AG. Photometric method for the quantitative determination of a material or substance in an analysis substance and photoelectric photometer for the performance of the aforesaid method. 3,988,591, Cl. 250-565.000.

Killy, Earl J., to Olinkraft, Inc. Display carton. 3,987,892, Cl. 206-44.00R.

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King, James R., to Rockwell International Corporation. A.C. protective circuit. 3,988,640, Cl. 317-9.00R.

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Knoy, Maurice G.; Wilkinson, Robert E.; and Johansen, Kenneth W., to Rostone Corporation. Precision-moldable abrasion-resistant molding composition and moldings. 3,988,291, Cl. 260-40.00R.
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Kuroda, Kiyoshi; Hori, Masyuki; Kobari, Sadami; and Shimizu, Takeshi, to Toyo Jozo Kabushiki Kaisha. Novel N,N-di-substituted amidines and several acid-addition salts thereof. 3,988,364, Cl. 260-501.140.

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Larson, Willis August, to Magic Dot, Inc. Membrane keyboard apparatus having common apertured electrode, aperture inserted electrodes and conductive bubble contactors. 3,988,551, Cl. 200-5.00A.

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Lermann, Peter; Vogt, Stefan; and Rieder, Alois, to AGFA-Gevaert, A.G. Automatic focussing system for photographic cameras. 3,988,747, Cl. 354-25.000.

Leroux, Jean E., to Societe Anonyme: Poclain. Device for assembling a bucket on a frame. 3,987,560, Cl. 37-4.000.

Lesner, Richard S.; and Roth, Robert D., to Chicago Pneumatic Tool Company. Tube nut wrench. 3,987,692, Cl. 81-57.130.

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Lewandowski, Hugo; and Fautz, Gerd Friedrich, to Heinrich Koppers Gesellschaft mit beschrankter Haftung. Apparatus for quenching coke pushed from coke ovens. 3,988,211, Cl. 202-227.000.

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Locher, Benjamin Carter. Powered amphibious bicycle. 3,987,747, Cl. 115-2.000.

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Loewy, Dalith; and Fink, Chava, to Israel Chemicals Ltd. Processes for the manufacture of feed-grade dicalcium phosphate and phosphoric acid. 3,988,420, Cl. 423-157.000.

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Long, LeBeau M. Energy saving device. 3,987,785, Cl. 126-296.000.

Longshore, Donald W.; and Kolacz, Ferdynand, to Allis-Chalmers Corporation. Vehicle park-brake and gear shifter with an interlock. 3,987,879, Cl. 192-4.00A.

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Luxa, Gunther; and Kirch, Johannes, to Siemens Aktiengesellschaft. Laminar insulating material for electrical apparatus. 3,988,645, Cl. 317-62.000.

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Magee, Philip S., to Chevron Research Company. Vinyl 2-substituted-thiovinyl sulfones. 3,988,376, Cl. 260-609.00E.

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Larson, Willis August, 3,988,551.

MaGill, Perry W., to American Potato Company. Apparatus for packing gable top containers. 3,987,604, Cl. 53-113.000.

Magne, Frank C.: *See—*
Mod, Robert R.; Harris, James A.; Arthur, Jett C., Jr.; Magne, Frank C.; Sumrell, Gene; and Novak, Arthur F., 3,988,226.

Magovern, George J.: *See—*
Purdy, David L.; Magovern, George J.; and Smyth, Nicholas P. D., 3,987,799.

Maher, Galeb H., to Sprague Electric Company. Low temperature fired electrical components and method of making same. 3,988,498, Cl. 428-434.000.

Mahoney, Frank A.; and Hutley, Ronald W. F., to Sperry Rand Corporation. Phase adjustment mechanism for use with a magnetic read station of a band printer. 3,987,723, Cl. 101-111.000.

Mahoney, Frank A.; and Hutley, Ronald W. F., to Sperry Rand Corporation. Mechanism for varying the gap between the print hammers and the type font faces of a printer. 3,987,886, Cl. 197-133.00R.

Maier, John E.: *See—*
Patel, Kalyanji U.; and Maier, John E., 3,988,502.

Mains, Harold E.: *See—*
Foulks, Harold C., Jr.; Rodenberg, Herbert G.; and Mains, Harold E., 3,988,330.

Malaviya, Shashi Dhar; Vora, Madhukar B.; and Wilson, William T., to International Business Machines Corporation. Random access solid-state image sensor with non-destructive read-out. 3,988,619, Cl. 307-311.000.

Maldon, Ronald L., to Raymond Lee Organization, Inc., The, a part interest. Dispenser for restrooms. 3,987,932, Cl. 221-96.000.

Malen, Charles; Desnos, Monique; Laubie, Michel; and Poignant, Jean-Claude, to Science Union et Cie, Societe Francaise de Recherche Medical. Cyclopropylamines as pharmaceuticals. 3,988,464, Cl. 424-272.000.

Malichenko, Evgeny Fedorovich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Latash, Jury Vadimovich; Chekotilo, Leonty Vasilievich; Baglai, Vitaly Mikhailovich; Artamonov, Viktor Leonidovich; Garkaljuk, Rodimir Ivanovich; Timchenko, Viktor Anatolievich; Malichenko, Evgeny Fedorovich; Stupak, Leonid Mikhailovich; and Dubinsky, Rudolf Solomonovich, 3,987,843.

Malina, Robert B., to Picenco International, Inc. Cyclone and line. 3,988,239, Cl. 209-211.000.

Malofsky, Bernard M., to Loctite Corporation. Anaerobic adhesive composition having improved strength at elevated temperature consisting of unsaturated diacrylate monomer and maleimide additive. 3,988,299, Cl. 260-47.0UA.

Malueg, Richard M.: *See—*
Meier, Michael J.; and Malueg, Richard M., 3,988,742.

Manabe, Yukihiro: *See—*
Minami, Giichi; Manabe, Yukihiro; and Suematsu, Yasuo, 3,988,281.

Manghisi, Elso; Salimbeni, Aldo; and Fregnan, Giancarlo, to Istituto Luso Farmaco d'Italia S.r.l. Phenoxyalkylamines. 3,988,475, Cl. 424-330.000.

Manitowoc Company, Inc., The: *See—*
Morrow, James G., Sr.; and Pech, David J., 3,988,008.

Mann, William C. Board-type fence. 3,988,009, Cl. 256-24.000.

Manning, Donald Franklin; Singer, Frederick William; and Student, Joseph James, to International Business Machines Corporation. Forms bursting apparatus. 3,987,949, Cl. 225-106.000.

Mantell, Jo Marie. Heated head enclosure. 3,988,568, Cl. 219-211.000.

Manufacture de Produits Chimiques Protex: *See—*
Balland, Jean, 3,988,111.

Manz, Vernon F.: *See—*
King, Jerry A.; Manz, Vernon F.; and MacNitt, Donald G., Jr., 3,988,088.

Mao, George W.; and Sabatino, Anthony, to Gould Inc. Method of making a lead-acid storage battery, and cell, capable of activation by the addition of electrolyte. 3,988,165, Cl. 29-623.200.

March, Anthony J. Card display device. 3,987,566, Cl. 40-124.400.

Marconi Company Limited, The: *See—*
Ellis, Alfred Brian Edwin, 3,988,529.

Mares, Frantisek, to Allied Chemical Corporation. Process for producing caprolactam from 6-aminocaproic acid. 3,988,319, Cl. 260-239.30A.

Margotte, Dieter; Schirmer, Hermann; Ott, Karl-Heinz; Kampf, Gunther; Peilstocker, Gunter; and Vernaleken, Hugo, to Bayer Aktiengesellschaft. Moulding compositions contain polycarbonate and graft copolymer of a resin forming monomer on a rubber. 3,988,389, Cl. 260-873.000.

Markwitz, Bernhard, to KG Bema "Schwimmflugel" Warenhandelsgesellschaft mbH & Co. Therapeutic aid. 3,987,506, Cl. 5-338.000.

Marquez, Joseph A.: *See—*
Weinstein, Marvin J.; Wagman, Gerald H.; and Marquez, Joseph A., 3,988,316.

Mars Limited: *See—*
Hibbert, Harry Russell; and Broadbent, John Edward Alexander, 3,988,485.

Marsh, B. Duane: *See—*
Angell, Richard G., Jr.; Anderson, Robert J.; Hobbs, Kenneth E.; James, David E.; and Marsh, B. Duane, 3,988,403.

Marshall, Robert Moore; and Swanson, Eugene Addison, to Allied Chemical Corporation. Melt spinning apparatus with convergence guide. 3,988,086, Cl. 425-72.00S.

Martin, Gilbert M.: *See—*
Boisrayon, Gerald M.; Martin, Gilbert M.; and Mollard, Jean C., 3,987,742.

Martin, James C.: *See—*
Irick, Gether, Jr.; Kelly, Charles A.; and Martin, James C., 3,988,295.

Martin, Lothar: *See—*
Fell, Wolfgang; and Martin, Lothar, 3,987,931.

Marton, Miksa. Vacuum attachment for abrading machine. 3,987,589, Cl. 51-170.00T.

Maschinenfabrik Augsburg-Nurnberg AG: *See—*
Meinke, Peter; and Flachenecker, Gerhard, 3,988,658.

Mascioli, Rocco L.: *See—*
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., 3,988,267.

Mashimo, Yukio: *See—*
Iura, Yukio; Uchiyama, Takashi; Yamamichi, Masayoshi; Mashimo, Yukio; and Taguchi, Tetsuya, 3,988,748.

Mason, Carl Peter, to Samole, Sidney; and Samole, Myron M. Electric elbow. 3,987,498, Cl. 3-1.100.

Masoneilan International, Inc.: *See—*
Baumann, Hans D., 3,987,809.

Massachusetts Institute of Technology: *See—*
Dewey, C. Forbes, Jr., 3,988,593.

Massignon, Daniel: *See—*
Dubois, Jacques Emile; Lacaze, Pierre Camille; Le Gressus, Claude; and Massignon, Daniel, 3,988,222.

Masuda, Michio: *See—*
Yanagimachi, Akio; Yamane, Hisakichi; Sawabe, Eiichi; Uehara, Takashi; Yoshino, Takehiko; Takezawa, Teruhiro; Masuda,

Michio; Nabeyama, Hiroaki; Fukuda, Masaaki; and Kayano, Tatsuo, 3,988,528.

Masuhara, Eiichi; Tarumi, Niro; and Tsuchiya, Makoto, to Hoya Lens Co., Ltd. Process for producing soft contact lenses. 3,988,274, Cl. 260-29.70H.

Matheis, John L. Hammer. 3,987,828, Cl. 145-30.00A.

Matsuda, Tetsuo; Watanabe, Susumu; Sakakibara, Shunpei; Munekata, Eisuke; Morikawa, Tadanori; Otani, Masaru; Noda, Toshiharu; Yamauchi, Hirose; Meguro, Tosio; and Kitazawa, Shuichi, to Toyo Jozo Kabushiki Kaisha. EEL calcitonin. 3,988,309, Cl. 260-112.50T.

Matsui, Takashi, to Sekisui Kaseihin Kogyo Kabushiki Kaisha. Process for preparing a vessel from thermoplastic resin plate. 3,988,191, Cl. 156-218.000.

Matsuo, Koichi: *See*—
Murakami, Noboru; Hirozawa, Koichiro; Matsuo, Koichi; and Obara, Kazuo, 3,987,690.

Matsushita Electric Industrial Co., Ltd.: *See*—
Minami, Shunji; and Oka, Shunzo, 3,988,596.
Wasa, Kiyotaka; Ohji, Kenzo; Yamazaki, Osamu; and Hayakawa, Shigeru, 3,988,232.
Yano, Yutaka, 3,988,753.

Matsushita Electronics Corporation: *See*—
Hosokoshi, Kakuichiro; Nakamura, Hiroto; and Sato, Akira, 3,988,777.

Matsuyama, Junichi; Sato, Akira; Nakajima, Yosuke; and Nakazawa, Yoshiyuki, to Fuji Photo Film Co., Ltd. Silver halide emulsions for recording electron rays. 3,988,513, Cl. 427-43.000.

Mattfeld, Johann; and Schmitt, Alfons, to Licentia Patent-Verwaltungs-G.m.b.H. Protection circuit for output stage of low frequency amplifiers. 3,988,695, Cl. 330-207.00P.

Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See*—
Zachariasse, Klaas, 3,988,699.

Maxon Corporation: *See*—
Condon, James A.; and Brenneman, G. Bruce, 3,987,679.

Mayama, Masayoshi: *See*—
Muramatsu, Toshio; Nagayasu, Koichi; Kimura, Masayuki; Terada, Sadatugu; and Mayama, Masayoshi, 3,988,158.

Mayer, Hans Johann: *See*—
Boguth, Walter; Leuenberger, Hans Georg Wilhelm; Mayer, Hans Johann; Widmer, Erich; and Zell, Reinhard, 3,988,205.

Mayer, Karl; Kampitsch, Friedrich; Frey, Helmut; and Letschnig, Friedrich. Device for separating cylindrical screen stencil from an ink tube and washing the stencil. 3,987,511, Cl. 15-21.00D.

Mayer, Manfred, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Movable bobbin transport apparatus. 3,987,974, Cl. 242-35.50A.

Mayrhofer, Max: *See*—
Ecker, Karl; Richter, Ingeborg; and Mayrhofer, Max, 3,988,177.

McAdow, Walter R., to Mobil Oil Corporation. Metallizing coating compositions. 3,988,494, Cl. 428-328.000.

McBride, Lyle E., Jr., to Texas Instruments Incorporated. Self-regulating heater. 3,987,772, Cl. 123-122.00F.

McClure, Orlie Bob. Rock crusher. 3,987,971, Cl. 241-73.000.

McCollum, John D.; and Quick, Leonard M., to Standard Oil Company (Indiana). Process for recovering upgraded products from coal. 3,988,238, Cl. 208-9.000.

McCombs, Frank Paul, to Owens-Corning Fiberglas Corporation. Glass fiber reinforced elastomers. 3,988,523, Cl. 428-378.000.

McCoy, Daniel J., to General Electric Company. Power supply system for generating constant power under maximum current conditions. 3,988,661, Cl. 321-2.000.

McCulloh, Mark, to Sun Sports Corporation of America. Parasail launching and retrieving apparatus. 3,987,746, Cl. 114-235.00R.

McCutchen, Charles: *See*—
Payne, Peter R.; and McCutchen, Charles, 3,987,987.

McDavid, William T., to Aquatronics, Inc. Transducer having enhanced acceleration cancellation characteristics. 3,988,620, Cl. 310-8.600.

McDonald, Bernard. Microorganism analysis device. 3,988,209, Cl. 195-139.000.

McDonnell Douglas Corporation: *See*—
Meier, Michael J.; and Malueg, Richard M., 3,988,742.
Rice, Robert R.; Nettle, Victor H.; Allen, Louis B.; and Green, Samuel I., 3,988,704.

McDowell, Mabel F., to Raymond Lee Organization, Inc., The, a part interest. Collapsible container detachably secured to vehicle seat. 3,987,945, Cl. 224-42.42A.

McGilvery, Washington I.: *See*—
Burgess, Billy; McGilvery, Washington I.; Michael, John R.; Snyder, Robert P.; Burgess, John Henry, deceased; and Burgess, Norma Lou, administratrix, 3,987,902.

McGinnis, Gerald E., to Lanz Medical Products Corporation. Tracheostomy tube and retainer. 3,987,798, Cl. 128-351.000.

McGowan, George F., deceased; and by McGowan, Jennie E., heir. Dental flask. 3,988,094, Cl. 425-175.000.

McGowan, Jennie E., heir: *See*—
McGowan, George F., deceased; and McGowan, Jennie E., heir, 3,988,094.

McGrath, N. Christian, to Sprague Electric Company. Batch plating of a long lead frame strip. 3,988,518, Cl. 427-436.000.

McGraw, Leslie D.: *See*—
Austin, Lowell W.; Smith, Edwin J.; and McGraw, Leslie D., 3,988,216.

McKaveney, James P.: *See*—
Garrett, Donald E.; and McKaveney, James P., 3,988,221.

McKenney, John D.; and Conway, William H., to McKenney, John D.; and Conway, William H., part interest to each. Apparatus for testing shock absorbers. 3,987,659, Cl. 73-11.000.

McKenzie, Ian, to Clark Equipment Company. Compact tree clamp and automatic sequence control for a tree length harvester. 3,987,826, Cl. 144-309.0AC.

McKinnon, Eugene T.; Drutz, Alvin S.; and Danta, Randall C., to McKinnon, Eugene T.; and Drutz, Alvin S., part interest to each. Electric motor controlling relay. 3,988,709, Cl. 338-57.000.

McLean, Thomas Fraser, to Chloride Batteries Australia Limited. Method of molding connectors in electrical accumulators. 3,988,169, Cl. 29-623.100.

McMullen, Larry Gene: *See*—
VanDerZyl, Roger Dale; McMullen, Larry Gene; and Kraske, Leroy Ernest, 3,987,914.

McMurray, Herman J., deceased; and by Eastland, William C., executor, to Eastland, Dorothy A. Ear tag. 3,987,570, Cl. 40-301.000.

McNair, David D.; and Schubert, Alvin L., to Eastman Kodak Company. Form slide locating apparatus for use in computer output microfilmers. 3,988,063, Cl. 355-40.000.

McNaney, Joseph T. Light optic data handling system. 3,988,055, Cl. 350-160.00R.

McWilliams, Joseph Anthony, to Micropore Insulation Limited. Method of forming thermal insulation materials. 3,988,190, Cl. 156-145.000.

Mead Corporation, The: *See*—
Spatz, Sydney M., 3,988,492.

Meadows, John, to Raychem Corporation. Wire cutter-stripper. 3,987,527, Cl. 29-236.000.

Meadus, Frederick Weldon; Sparks, Bryan D.; and Puddington, Ira E., to Canadian Patents and Development Limited. Iron and lead-containing composite metal shot. 3,987,730, Cl. 102-42.00R.

Mecham, Woodrow W.: *See*—
Downs, Gordon L.; and Mecham, Woodrow W., 3,987,761.

Medac Gesellschaft fur klinische Spezial praparate mbH: *See*—
Krotz, Walter, 3,988,230.

Medical Data Systems Corporation: *See*—
O'Neill, William J.; Strange, Donald R.; and Miller, Philip A., 3,988,585.

Medical & Electrical Instrumentation Company Limited: *See*—
Davies, Arthur Gordon, 3,988,611.

Medovar, Boris Izrailevich: *See*—
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Latash, Jury Vadimovich; Chekotilo, Leonty Vasilievich; Baglai, Vitaly Mikhailovich; Artamonov, Viktor Leonidovich; Garkaljuk, Rodimir Ivanovich; Timchenko, Viktor Anatolievich; Malichenko, Evgeny Fedorovich; Stupak, Leonid Mikhailovich; and Dubinsky, Rudolf Solomonovich, 3,987,843.

Meeks, Lawrence A.: *See*—
Biggs, James W.; and Meeks, Lawrence A., 3,988,496.

Meguro, Tosio: *See*—
Matsuda, Tetsuo; Watanabe, Susumu; Sakakibara, Shunpei; Munekata, Eisuke; Morikawa, Tadanori; Otani, Masaru; Noda, Toshiharu; Yamauchi, Hirose; Meguro, Tosio; and Kitazawa, Shuichi, 3,988,309.

Meier, Herman, Jr. Solar heat holder. 3,987,782, Cl. 126-271.000.

Meier, Jean, to Roussel-UCLAF. Novel analgesic compositions. 3,988,459, Cl. 424-258.000.

Meier, Michael J.; and Malueg, Richard M., to McDonnell Douglas Corporation. Recorder using light emitting diodes. 3,988,742, Cl. 346-107.00R.

Meiji Seika Kaisha, Ltd.: *See*—
Seki, Shigeo; Sugimoto, Shingo; and Nakajima, Shokichi, 3,988,326.

Meinke, Peter; and Flachenecker, Gerhard, to Maschinenfabrik Augsburg-Nurnberg AG. Electromagnetic drive assembly for rotary bodies using a magnetically mounted rotor. 3,988,658, Cl. 318-647.000.

Melitta, Inc.: *See*—
Bergmann, Karl H.; and Levine, Harvey, 3,987,717.

Melvin, S. Noel: *See*—
Vogel, Arthur E., 3,988,755.

Mendelsohn, Melvin D.; and Klima, William G., to Sola Basic Industries, Inc. Sickle blade heater. 3,988,106, Cl. 432-230.000.

Meneses, Hector A.: *See*—
Crane, Dale E.; Jones, Robert E.; and Meneses, Hector A., 3,988,698.

Mentler, Sandor, to General Electric Company. Signal amplitude monitor and relay driver circuit. 3,988,649, Cl. 317-148.50R.

Merck & Co., Inc.: *See*—
Christy, Marcia Elizabeth, 3,988,454.
Gitterman, Charles O., 3,988,463.
Novello, Frederick C., 3,988,324.
Prugh, John D., 3,988,342.
Saari, Walfred S.; and King, Stella W., 3,988,341.

Merck Patent Gesellschaft mit beschrankter Haftung: *See*—
Rogalski, Werner; Kirchlechner, Richard; Seubert, Juergen; Gottschlich, Rudolf; Hameister, Walter; Bergmann, Rolf; and Wahlig, Helmut, 3,988,468.

Merithew, David L.: *See*—
Zemek, Albert W.; Holmes, Robert H.; and Merithew, David L., 3,987,528.

Merker, George; Krupp, Joseph; Navi, Menashe; and Ward, Thomas A., to Cutler-Hammer, Inc. High speed in-line paper inserting apparatus and method. 3,988,016, Cl. 270-55.000.

Merlin, Jean C.; and Serres, Bernard M. Keyboard type telephone station adapted to transmit dialling pulses and multifrequency signals. 3,988,549, Cl. 179-90.00K.

Merritt, John H., to Sperry Rand Corporation. Directional control apparatus for a bale thrower. 3,987,890, Cl. 198-316.000.

Mersch, Peter; Siepermann, Walter; and Zech, Kurt, to Koppern & Co. KG. Roll briquetting press. 3,988,095, Cl. 425-237.000.

Merson, Karol J. W. Portable seam locking device. 3,987,740, Cl. 113-54.00R.

Messenger, Joseph U., to Mobil Oil Corporation. Lost circulation control. 3,987,855, Cl. 166-294.000.

Messerschmitt-Bolkow-Blohm GmbH: *See—*
Born, Gunthard, 3,988,700.
Boss, Holm Diethard; and Butschek, Hans Albert, 3,987,702.
Muller, Gunter, 3,987,985.

Metabowerke KG Closs, Rauch & Schnitzler: *See—*
Schnizler, Albrecht, Jr.; and Holzwarth, Dietrich, 3,988,656.

Metallgesellschaft Aktiengesellschaft: *See—*
Dorr, Karl-Heinz; Bielz, Siegfried; Constantinescu, Dan; Vollmer, Hubert; Beuchelt, Rudolf; Guth, Hans; Reher, Peter; and Wieschen, Herman, 3,988,428.
Jockel, Heinz; Moller, Friedrich Wilhelm; Mortel, Hans Gunter; and Tanz, Heiner, 3,988,425.

Metco Inc.: *See—*
Vogts, William A.; and Daley, Horace S., 3,988,566.

Metro Toronto News Company Limited: *See—*
Gardiner, Alec R., 3,987,960.

Mettler Instrumente AG: *See—*
Smith, James E., 3,987,861.

Meyer, Gordon R. Multiple padlock device. 3,988,031. Cl. 292-153.000.

Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. Bicyclic derivatives of 1,4-dihydropyridine 3,5-carboxylic acid esters. 3,988,458, Cl. 424-251.000.

Meyer, Jerry W.: *See—*
Callihan, Rudy B.; Meyer, Jerry W.; Wainwright, Clyde S., Jr.; and Taylor, Bobby B., 3,987,854.

Meyer, Rudolf: *See—*
Hertz, Helmuth; and Meyer, Rudolf, 3,988,740.

Meyerhoefer, Carl E., to General Signal Corporation. Tilting floor cleaner. 3,987,512, Cl. 15 50.00R.

Meyers, Robert M.: *See—*
Kutch, Edward F.; Meyers, Robert M.; and Sitter, Matthew M., 3,988,276.

Michael, John R.: *See—*
Burgess, Billy; McGilvery, Washington I.; Michael, John R.; Snyder, Robert P.; Burgess, John Henry, deceased; and Burgess, Norma Lou, administratrix, 3,987,902.

Mick, Peter; and Beck, Donald, to Video Tek, Inc. Video-type universal motion and intrusion detection system. 3,988,533, Cl. 178-6.800.

Micropore Insulation Limited: *See—*
McWilliams, Joseph Anthony, 3,988,190.

Middlemark, Marvin P. Pivoted rod television receiving antenna for indoor use. 3,988,737, Cl. 343-809.000.

Midland-Ross Corporation: *See—*
Bulanchuk, William J., 3,987,877.
Foflygen, Ronald W., 3,987,992.

Mihovski, Kalcho Minkov: *See—*
Vitanov, Yordan Ivanov; Yordanov, Boris Petrov; Mihovski, Kalcho Minkov; and Drakaliski, Boris Yordanov, 3,987,844.

Mikonis, Paul, to United States of America, Navy. Voltage ramp temperature controller. 3,988,682, Cl. 328-3.000.

Miksovsky, Felix; Fikentscher, Rolf; and Sanner, Axel, to BASF Aktiengesellschaft. Manufacture of bonded textile sheet structures. 3,988,516, Cl. 427-342.000.

Mileski, Raymond P.; Bober, Henry T.; and Mitchel, James O., to Xerox Corporation. Reflective document feeder. 3,988,065, Cl. 355-64.000.

Milgo Electronic Corporation: *See—*
Scott, John B.; Whang, Sang Y.; Ragsdale, Robert G.; and Chiu, Ran-Fun, 3,988,540.
Whang, Sang Y., 3,988,676.

Miller, Howard A.; Smith, Kenneth L.; and Stacy, Peter M., to Eastman Kodak Company. Relief printing process. 3,987,728, Cl. 101-426.000.

Miller, Norman C.; and Saunders, Richard C., to Rockwell International Corporation. Bonded electrical contact for thermoelectric semiconductor element. 3,988,171, Cl. 136-237.000.

Miller, Norman P.: *See—*
Smith, Lewis V., Jr.; and Miller, Norman P., 3,988,736.

Miller, Philip A.: *See—*
O'Neill, William J.; Strange, Donald R.; and Miller, Philip A., 3,988,585.

Miller, Spencer J. Cold air draft prevention device. 3,987,587, Cl. 49-493.000.

Miller, Ward B., to Owens-Corning Fiberglas Corporation. Apparatus for dispensing elongate flexible material. 3,987,752, Cl. 118-42.000.

Miller, William Don, to Newby, Gordon M., a part interest. Reusable pneumatic dunnage device. 3,987,736, Cl. 105-491.000.

Mills, Kenneth R., to Phillips Petroleum Company. Stabilizer system for polyolefins. 3,988,293, Cl. 260-45.80R.

Mills, Walter D.: *See—*
Harrow, Geoffrey A.; Mills, Walter D.; Wilson, John L.; and Finlay, Ian C., 3,987,773.

Mills, William R. Shingle removing tool. 3,987,827, Cl. 145-1.00A.

Milnamow, John P., to Johnson & Johnson. Diaper with tab fastener having backing web and face web. 3,987,793, Cl. 128-287.000.

Minami, Giichi; Manabe, Yukihiro; and Suematsu, Yasuo, to Shinto Paint Co., Ltd. Water-dispersible thermosetting coating composition. 3,988,281, Cl. 260-29.6TA.

Minami, Shunji; and Oka, Shunzo, to Matsushita Electric Industrial Co., Ltd. Voltage memory device. 3,988,596, Cl. 307-246.000.

Mineo, Kinji, to Yamato Iron Works Co., Ltd. Cap seal for drum. 3,987,929, Cl. 220-257.000.

Minnesota Mining and Manufacturing Company: *See—*
Bartizal, Dennis C., 3,988,278.
Fritts, Robert W., 3,987,567.
Patel, Kalyanji U.; and Maier, John E., 3,988,502.

Minolta Camera Kabushiki Kaisha: *See—*
Kitaura, Mashio, 3,988,069.

Mitas, Josef: *See—*
Klicka, Vladimir; Mitas, Josef; and Vacek, Josef, 3,988,414.

Mitchel, James O.: *See—*
Mileski, Raymond P.; Bober, Henry T.; and Mitchel, James O., 3,988,065.

Mitchell, Reid Logan: *See—*
Wilson, Jim Degnan; Beelik, Andrew; Hergert, Herbert Lawrence; and Mitchell, Reid Logan, 3,988,198.

Mitin, Igor Viktorovich; and Aralov, Mstislav Semenovich. Device for recording information in the form of signs on a light-sensitive material by means of a light beam and a light-beam oscillograph built around said device. 3,988,743, Cl. 346-109.000.

Mitka, Boleslaw: *See—*
Pikon, Jerzy; Wasilewski, Piotr; and Mitka, Boleslaw, 3,988,210.

Mitsubishi Chemical Industries Ltd.: *See—*
Ishida, Nakao; Okada, Tsutomu; and Kamata, Akira, 3,988,462.

Mitsubishi Gas Chemical Company, Inc.: *See—*
Fujiyama, Susumu; Takahashi, Takehiko; Takagawa, Minoru; and Ozao, Shigeki, 3,988,424.

Mitsubishi Rayon Co., Ltd.: *See—*
Chimura, Kazuya; Iwata, Hiroshi; Kaneko, Takashi; and Nakazono, Ryuichi, 3,988,387.
Kameda, Nobuo; Nakai, Yoshio; and Takahashi, Mitsuru, 3,988,392.
Kato, Tetsuji; Tamai, Katsumi; Kamada, Isao; Kichiji, Hiroshi; Nakai, Yoshio; Kitahara, Haruyoshi; Iwaoka, Yasuhiko; Okajima, Kiyonori; and Ueno, Tadaomi, 3,988,098.

Mitsui, Yoshihiro: *See—*
Endo, Takeshi; Mitsui, Yoshihiro; and Kamakura, Hiroshi, 3,988,652.

Mitsumi Electric Co., Ltd.: *See—*
Naoi, Mitsuaki; Kishida, Chozo; and Shiotsuki, Kenichi, 3,987,680.

Mittendorf, Theodor H.; and Keough, William E. Vehicle insect protection apparatus. 3,987,863, Cl. 180-68.00P.

Mizsak, Stephen A.: *See—*
Argoudelis, Alexander D.; and Mizsak, Stephen A., 3,988,314.

Mobil Oil Corporation: *See—*
Fitch, John L., 3,987,850.
McAdow, Walter R., 3,988,494.
Messenger, Joseph U., 3,987,855.

Mod, Robert R.; Harris, James A.; Arthur, Jett C., Jr.; Magne, Frank C.; Sumrell, Gene; and Novak, Arthur F., to United States of America, Agriculture. Process for the preparation of phosphonated N,N-disubstituted fatty amides. 3,988,226, Cl. 204-158.0HE.

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Moser, Jesse Lee; Reavis, Robert Philmore; and Soderstrom, Melvin Andrew, to AMP Incorporated. Swing out load coil assembly. 3,988,707, Cl. 336-65.000.

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Nagamura, Fumitaka. Record disc cutting apparatus. 3,988,025, Cl. 274-37.000.

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Pereda, Eugene F. Liquid air engine. 3,987,632, Cl. 60-671.000.
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Politycki, Alfred, to Siemens Aktiengesellschaft. Method of forming a thin film iris diaphragm for a corpuscular beam apparatus. 3,988,153, Cl. 96-36.400.
Pollock, Peggy, executrix: *See*—
Nelson, Jerome W.; Nay, Earl B.; Wittmann, Eric W.; Pollock, Robert E., deceased; and Pollock, Peggy, executrix, 3,987,523.
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Popenoe, Charles H. Light reflective opti-mechanical displacement microindicator. 3,987,668, Cl. 73-88.00F.
Popenoe, Charles H. Opti-mechanical displacement microindicator. 3,987,699, Cl. 85-62.000.
Poplawski, Eugene M., to Caterpillar Tractor Co. Fairlead roller assembly. 3,987,526, Cl. 29-116.00R.
Popp, Roger C., to Chandler Evans Inc. Servo valve control system. 3,987,998, Cl. 251-28.000.
Port, Erich: *See*—
Kuemmerle, Karl A.; Port, Erich; and Zafiropulo, Pitro A., 3,988,545.
Porter, William H. Electrical generating system. 3,988,592, Cl. 290-53.000.
Portoso, Mauro; Tivoli, Aldo; and Peruglia, Marco, to Fiat Societa per Azioni. Control valve for vehicle air conditioning systems. 3,987,642, Cl. 62-211.000.
Posselt, Manfred: *See*—
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Potlatch Corporation: *See*—
Hines, John H., 3,987,599.

Potosnak, Stephen J.; and Russo, Carl J., to J. P. Stevens & Co., Inc. Apparatus for crushing cloth. 3,987,519, Cl. 26-69.00R.

Potter, John Johnson, Jr.: *See—*
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Povazhny, Boris Stepanovich: *See—*
Shalavina, Elena Leonidovna; Ponomareva, Elizaveta Ivanovna; Zazubin, Arkady Ivanovich; Ostapenko, Tatyana Dmitrievna; Ivanova, Galina Artemievna; Romanov, Gennady Alexeevich; Bespalov, Evgeny Nikolaevich; Prokopov, Igor Vladimirovich; Povazhny, Boris Stepanovich; Smirnov, Boris Alexeevich; Vasiliev, Viktor Nikolaevich; Turakbaev, Salavat Ishanovich; Kunaev, Askar Minliakhmedovich; Tursunbaev, Turar Baltabaevich; and Ponomarev, Viktor Dmitrievich, deceased, 3,988,150.

Powell, Hayward. Solar heating panel. 3,987,783, Cl. 126-271.000.

Powell, Joe A.; and James, Paul C., to B. F. Goodrich Company, The. Balanced pneumatic tire. 3,987,833, Cl. 152-330.00R.

Powell, Ronald Lee; and Smith, Frank Patterson, 2nd, to Narco Scientific Industries, Inc. Ground speed calculation for digital DME. 3,987,988, Cl. 244-182.000.

PPG Industries, Inc.: *See—*
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Gunby, Leslie, 3,988,220.

Preiser, Ralph H.; Stellwagen, Frank W.; and Rigazio, Anthony W., to General Time Corporation. Low power synchronous motor and line cord therefor. 3,988,639, Cl. 317-9.00R.

Price, Cyrul Arthur, to International Business Machines Corporation. Field effect transistor bias circuit. 3,988,617, Cl. 307-270.000.

Priest, John Ricks: *See—*
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Kuzavkov, Nikolai Grigorievich; Pakhomov, Vladimir Vasilievich; Prin, Ivan Ivanovich; and Shabalin, Alexandr Sergeevich, 3,988,203.

Prinz, Richard; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, to Bayer Aktiengesellschaft. Thermoplastic polycarbonate moulding compositions. 3,988,390, Cl. 260-873.000.

Prival, Guy; Hennequin, Jacques Michel; and Brette, Yves-Jean Francois, to Societe Industrielle Honeywell Bull. Inductive device for precisely positioning a movable member. 3,988,657, Cl. 318-594.000.

Procter, Brian John: *See—*
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Procter & Gamble Company, The: *See—*
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Properzi, Giulio. Roll setting device for rolling mills for metal bars or the like. 3,987,657, Cl. 72-247.000.

Prugh, John D., to Merck & Co., Inc. Piperidylidene derivatives of cyano-5H-dibenzo[a,d]cycloheptene. 3,988,342, Cl. 260-293.620.

Puddington, Ira E.: *See—*
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Puig, John E.; and Babiec, John S., Jr., to Olin Corporation. High load-bearing, high strength polyurethane foam. 3,988,269, Cl. 260-2.5AT.

Puma, Anthony R. Water valve. 3,987,965, Cl. 239-583.000.

Purdy, David L.; Magovern, George J.; and Smyth, Nicholas P. D., to Coratomic Inc. Heart pacer. 3,987,799, Cl. 128-419.00P.

Pyrotector, Incorporated: *See—*
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Q-S Oxygen Processes, Inc.: *See—*
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Queneau, Paul E.; and Schuhmann, Reinhardt, Jr., 3,988,149.

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Queneau, Paul E.; and Schuhmann, Reinhardt, Jr., to Q-S Oxygen Processes, Inc. Metallurgical process using oxygen. 3,988,149, Cl. 75-74.000.

Quick, Leonard M.: *See—*
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R. Alkan & Cie: *See—*
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Rabinowitz, Robert: *See—*
Witschonke, Charles Richard; and Rabinowitz, Robert, 3,988,277.

Rafael, Johann. Floating device for removing refuse situated on and under a water surface. 3,988,241, Cl. 210-208.000.

Ragsdale, Robert G.: *See—*
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Raiteri, Angelo, to Inductosyn Corporation. Measuring apparatus. 3,987,552, Cl. 33-178.00E.

Ramsey, James R.; Baier, Terence D.; and Swim, William B., to Trane Company, The. Electrostatic precipitator with rapper and pneumatic flow blocking. 3,988,130, Cl. 55-112.000.

Randall, David I.: *See—*
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Copes, Joseph P.; and Randall, David I., 3,988,350.
Copes, Joseph P.; and Randall, David I., 3,988,351.

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Rasmussen, Donald Edgar; and Hof, Peter John, Jr., to United States of America, Interior. Self-contained instrument for measuring subterranean tunnel wall deflection. 3,987,667, Cl. 73-88.00E.

Rasquin, Werner; and Sutterlin, Klaus, to Felten & Guilleaume Kabelwerke AG. Internally cooled high-voltage high-energy cable. 3,988,526, Cl. 174-15.00C.

Ratz, Adolf; and Schafer, Robert, to Andreas Stihl Maschinenfabrik. Portable motor chain saw. 3,987,543, Cl. 30-383.000.

Ray, Gardner C., to Phillips Petroleum Company. Catalyst regeneration. 3,988,259, Cl. 252-416.000.

Raychem Corporation: *See—*
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Raymond, Joseph H., Jr. Electronic calculator or digital processor chip having multiple function arithmetic unit output. 3,988,604, Cl. 235-156.000.

Raymond Lee Organization, Inc., The: *See—*
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Hill, Geraldine A., 3,987,720.
Holley, James D., 3,987,495.
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Denning, Richard; and Einthoven, Willem Gerard, 3,988,759.
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Rea Magnet Wire Co., Inc.: *See—*
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Shelby, Thomas A.; and Gallien, Shelby W., 3,988,283.

Reavis, Robert Philmore: *See—*
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Reber, Raymond A.: *See—*
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Recognition Equipment Incorporated: *See—*
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Reed, Richard Dean; and Branham, Doud Roger, to Oxford Laboratories Inc. Volume setting mechanism for fluid discharge devices. 3,987,934, Cl. 222-43.000.

Reese, Anthony L., to Dresser Industries, Inc. Seals for a gas service butterfly valve. 3,988,000, Cl. 251-214.000.

Regie Nationale des Usines Renault: *See—*
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Reher, Peter: *See—*
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Reichenbach, Jerry D., to Chicago Rawhide Manufacturing Company. Oil seal manufacturing apparatus and method. 3,988,091, Cl. 425-125.000.

Reichert, Donald G., to ABC Packaging Machine Corporation. Carton squaring mechanism in a case erector. 3,987,710, Cl. 93-36.0SQ.

Reiff, Helmut: *See—*
Dietrich, Werner; Reiff, Helmut; and Dieterich, Dieter, 3,988,268.

Reinecke, Erich, to WABCO Westinghouse GmbH. Individual wheel anti-skid brake control system employing electronic comparison and brake pressure differential limiting circuitry. 3,988,043, Cl. 303-21.00A.

Reinhall, Rolf Bertil. Device in machine elements with closed casing. 3,987,973, Cl. 241-259.200.

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Reiss, Martin H.; and Solomon, Elias E., to Gulf & Western Manufacturing Company. Infrared intrusion detection apparatus. 3,988,726, Cl. 340-258.00D.

Reiter, Raymond A.: *See—*
Esposito, David; Reiter, Raymond A.; and Del Corso, Gregory J., 3,988,084.

Reitz, Helmut: *See—*
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Rentschler, Waldemar T.; and Starp, Franz W. R., to Prontor-Werk, Alfred Gauthier GmbH. Fast operating slit shutter camera. 3,988,754, Cl. 354-246.000.

Repella, James A., to Federal-Mogul Corporation. Method and apparatus for quickly testing the sealing effectiveness of a radial-lip shaft seal. 3,987,663, Cl. 73-46.000.

Research Corporation: *See—*
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Rex, Donald K.: *See—*
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Reynolds, Thomas D. Storage bag and method for using same. 3,988,499, Cl. 428-474.000.

Rhein, Otto H., to Henkell & Co. Method for accelerating the crystallization and removal of tartar from a tartarous beverage. 3,988,486, Cl. 426-495.000.

Rheinpfalzische Blechemballagenfabrik G. Schonung & Co. KG: *See—*
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Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; by Plattner, Werner, executor; Vomel, Wolfgang; and Sauer, Winfriede, to Boehringer Mannheim G.m.b.H. Cyclopentenoquinolone compounds for treating bacterial infections. 3,988,460, Cl. 424-258.000.

Rhone-Poulenc S.A.: *See—*
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Rice, Robert F.: *See—*
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Rice, Robert R.; Nettle, Victor H.; Allen, Louis B.; and Green, Samuel I., to McDonnell Douglas Corporation. Broadband electrooptical modulator. 3,988,704, Cl. 332-7.510.

Richards, Powell; and Smith, Terry D., to United States of America, Energy Research and Development Administration. Kit for the rapid preparation of ^{99m}Tc red blood cells. 3,988,429, Cl. 424-1.000.

Richardson, Jack F. Fireplace grate. 3,987,779, Cl. 126-165.000.

Richmond, Roy H., Jr., to Eagle Manufacturing Company. Detachable pouring funnel for containers. 3,987,943, Cl. 222-570.000.

Richter Gedeon Vegyeszeti Gyar Rt.: *See—*
Kekesy, Tibor; Szeberenyi, Szabolcs; Beer, Gyorgy; Dudas, Antal; Hajos, Gyorgy; Szporny, Laszlo; and Czajlik nee Csizer, Eva, 3,988,322.

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Riddle, Marlene A. Three dimensional image reproduction. 3,988,520, Cl. 428-15.000.

Rieder, Alois: *See—*
Lermann, Peter; Vogt, Stefan; and Rieder, Alois, 3,988,747.

Rifkin, Morton S. Locking cam for awning windows. 3,987,586, Cl. 49-394.000.

Rigazio, Anthony W.: *See—*
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Riken Lightmetal Industry Co., Ltd.: *See—*
Ikegaya, Masashi, 3,988,217.

Rinaldi, Noe Ugo, to Tecnochim S.r.l. Gas cleaning process and equipment. 3,988,421, Cl. 423-210.000.

Ripley, Dennis L.: *See—*
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Roantree, William J., to Cyclecentric Corporation. Variable speed transmission. 3,987,682, Cl. 74-117.000.

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Robbins, Lanny A., to Dow Chemical Company, The. Apparatus for countercurrent liquid-liquid extraction. 3,988,116, Cl. 23-270.50T.

Robbins, Montague Albert, to Resilient Grip Limited. Multi position rail fastenings. 3,987,962, Cl. 238-287.000.

Robert Bosch G.m.b.H.: *See—*
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Robert Zapp, Werkzeug-und Maschinenfabrik GmbH, Firma: *See—*
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Robertelli, Paul, to Lawrence Peska Associates, Inc., a part interest. Dental prophylactic handpiece. 3,987,549, Cl. 32-59.000.

Roberts, Arnold L.; and Adelkoff, Stuart. Apparatus for treating engine exhaust gases. 3,988,113, Cl. 23-252.00R.

Roberts, Edith V. Foot treatment shoe and method of using same. 3,987,559, Cl. 36-95.000.

Roberts, Karl H.: *See—*
Hernandez, John Michael; and Roberts, Karl H., 3,987,792.

Roberts, Thomas C.; Jones, Charles; Lamping, Harold D.; and Myers, David M., to Curtiss-Wright Corporation. Stratified charge rotary engine with variable spray angle fuel nozzle. 3,987,759, Cl. 123-8.090.

Robertshaw Controls Company: *See—*
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Robeson, Charles D.: *See—*
Ames, Stanley R.; and Robeson, Charles D., 3,988,480.

Robinson, Charles T. Clamping means for clasping terminal posts. 3,988,051, Cl. 339-238.000.

Robinson, Lyle A., to United States of America, Research and Development Administration. Protective carrier for microcircuit devices. 3,988,648, Cl. 317-101.0CC.

Rochling, Hans F. W.; Buchel, Karl-Heinz; and Korte, Friedrich W.A.G.K., to Shell Oil Company. Benzimidazole insecticides. 3,988,465, Cl. 424-273.000.

Rockwell International Corporation: *See—*
Drapac, Michael J., 3,988,705.
King, James R., 3,988,640.
Miller, Norman C.; and Saunders, Richard C., 3,988,171.

Rodenberg, Herbert G.: *See—*
Foulks, Harold C., Jr.; Rodenberg, Herbert G.; and Mains, Harold E., 3,988,330.

Rodgers, Harris G., Sr., to Corning Glass Works. Pin for supporting the aperture mask in a color television picture tube. 3,988,631, Cl. 313-402.000.

Rodin, Sylvi: *See—*
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Rogalski, Werner; Kirchlechner, Richard; Seubert, Juergen; Gottschlich, Rudolf; Hameister, Walter; Bergmann, Rolf; and Wahlig, Helmut, to Merck Patent Gesellschaft mit beschrankter Haftung. 7-Methoxy-6-thiatetracyclines and their preparation. 3,988,468, Cl. 424-275.000.

Rogers, Herbert E., Jr.: *See—*
Dreyer, Dennis G.; Foley, Edward M.; and Rogers, Herbert E., Jr., 3,988,524.

Rogers, Melvin F., to Zenith Radio Corporation. Method for reducing thermally induced fracture of cathode ray tube bulbs during salvage. 3,988,136, Cl. 65-23.000.

Rogers, Paul. Rotary steam engine. 3,988,082, Cl. 418-244.000.

Rognlie, Eric L.: *See—*
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Rogus, Arnold J.: *See—*
Williams, Keith E.; and Rogus, Arnold J., 3,988,049.

Romania, Samuel Richard; and Sprenkle, George Joseph, to Burroughs Corporation. Retractable wire guide for wire wrap gun. 3,987,823, Cl. 140-124.000.

Romanov, Gennady Alexeevich: *See—*
Shalavina, Elena Leonidovna; Ponomareva, Elizaveta Ivanovna; Zazubin, Arkady Ivanovich; Ostapenko, Tatyana Dmitrievna; Ivanova, Galina Artemievna; Romanov, Gennady Alexeevich; Bespalov, Evgeny Nikolaevich; Prokopov, Igor Vladimirovich; Povazhny, Boris Stepanovich; Smirnov, Boris Alexeevich; Vasiliev, Viktor Nikolaevich; Turakbaev, Salavat Ishanovich; Kunaev, Askar Minliakhmedovich; Tursunbaev, Turar Baltabaevich; and Ponomarev, Viktor Dmitrievich, deceased, 3,988,150.

Root, Russell L., to Addressograph Multigraph Corporation. Pressure fixing of toners. 3,988,061, Cl. 96-1.0SD.

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Rosenberg, Jerome. Letter and the like having a self-adjusting orbital pin-mount for installing the letter. 3,987,568, Cl. 40-140.000.

Rosenberg, Tom: *See—*
Cates, Henry J., Jr.; Rosenberg, Tom; and Entrekin, Harvey E., 3,987,916.

Rosenberg, William E., to Columbia Chemical Corporation. Baths and additives for the electrodeposition of bright zinc. 3,988,219, Cl. 204-55.00R.

Rosenthal, Joel W.; and Kozlowski, Robert H., to Chevron Research Company. Motor fuel composition. 3,988,122, Cl. 44-56.000.

Rosenthale, Marvin E.: *See—*
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Rossopoulos, Stephane, to Hermes Precisa International S.A. Electrode for ink jet printing. 3,988,741, Cl. 346-75.000.

Rostone Corporation: *See—*
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Rostrup-Nielsen, Jens: *See—*
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Roteman, Jerome, to American Can Company. Epoxy resin photoresist with iodoform and bismuth triphenyl. 3,988,152, Cl. 96-35.100.

Roth, Peter R.; and Patkay, Jean-Pierre D., to Hewlett-Packard Company. Noise source for transfer function testing. 3,988,667, Cl. 324-57.00N.

Roth, Robert D.: *See—*
Lesner, Richard S.; and Roth, Robert D., 3,987,692.

Roth, Shirley H., to Cities Service Company. Intumescent composition. 3,988,266, Cl. 260-2.5FP.

Rottier, Marcel Rene: *See—*
Bottard, Gilles Jean Marcel; and Rottier, Marcel Rene, 3,988,579.

Roueche, Armand, to Ciba-Geigy Corporation. Tetrakisazo pigments prepared by reacting an aminoazobenzene and an aryl-bis-acetoacetylamino derivative. 3,988,312, Cl. 260-166.000.

Rougas, John A.: *See—*
Clarke, James McMillen; Hearty, Charles E.; and Rougas, John A., 3,988,679.

Rough, Robert R., to Owens-Illinois, Inc. Method and apparatus for melting glass-making materials. 3,988,138, Cl. 65-134.000.

Roussel-UCLAF: *See—*
Derible, Pierre Henri; Lavaux, Jean-Paul; and Laurent, Jacques, 3,988,453.
Meier, Jean, 3,988,459.
Perronnet, Jacques; and Taliani, Laurent, 3,988,444.
Pierdet, Andre; and Vignau, Michel, 3,988,356.
Rowland, Bobby A.; Durham, Dwight H.; and Thomas, O. Leon, to Southwire Company. Multiplex cable insulation fault locator system with electrical conducting guides mounted on a rotating disc. 3,988,666, Cl. 324-54.000.
Ruberte, Antonio Lafuente. Brake mechanism. 3,987,873, Cl. 188-267.000.
Rubino, Robert V.: *See—*
Haining, Frank W.; Rubino, Robert V.; and Wiley, Robert T., 3,988,408.
Ruble, Ernest Burlin, to Whirlpool Corporation. Unidirectional agitation accessory for automatic washer. 3,987,652, Cl. 68-134.000.
Ruch, David E.; and Koski, Lowell H., to General Motors Corporation. Circuit for rectifying a three-phase alternating signal. 3,988,660, Cl. 321-2.000.
Ruda, Ernest V.; Blickenstaff, John E.; and Schneider, Clayton J., Jr., to Calspan Corporation. Centrifugal chaff dispenser. 3,987,966, Cl. 239-687.000.
Rueff, Claude. Device for the destruction of flying insects, especially in closed rooms. 3,987,578, Cl. 43-139.000.
Ruhrchemie Aktiengesellschaft: *See—*
Schnur, Friedrich; Hibbel, Josef; and Cornils, Boy, 3,988,117.
Russell, David D.: *See—*
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Russo, Carl J.: *See—*
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Rusyanova, Natalya Dmitrievna: *See—*
Nazarov, Vladimir Georgievich; Nepokrytykh, Vladimir Konstantinovich; Vasilevskaya, Ljubov Markovna; Rusyanova, Natalya Dmitrievna; Volgina, Natalya Borisovna; Chernyshev, Vitaly Fedorovich; Chetverikova, Nina Alexandrovna; and Kostromin, Alexandr Stepanovich, 3,988,354.
Ruti Machinery Works Ltd.: *See—*
Freisler, Erhard, 3,987,822.
Rutkowsky, Bernard J.: *See—*
Sanderson, Anne; Mosciano, Gerard; Pittet, Alan O.; Strasburger, Louis J.; Schreiber, William L.; Van Praag, Michel; Shuster, Edward J.; Rutkowsky, Bernard J.; and Evers, William J., 3,988,487.
Saari, Walfred S.; and King, Stella W., to Merck & Co., Inc. Esterification process. 3,988,341, Cl. 260-281.0GN.
Saarinen, Martti, to Oy Tampella AB. Bipartite box and blank for manufacturing the same. 3,987,955, Cl. 229-20.000.
Sabatella, Joseph, Jr.; and Kane, Henry James, Jr., to United Technologies Corporation. Method for reducing jet exhaust takeoff noise from a turbofan engine. 3,987,621, Cl. 60-204.000.
Sabatino, Anthony: *See—*
Mao, George W.; and Sabatino, Anthony, 3,988,165.
Sabes, Jean, to Societe Anonyme dite: J. Sabes & Cie. Liquid cooled, externally engaging drum brake. 3,987,872, Cl. 188-264.00E.
Saccoccio, Nazareno J., to Aro-Sac Inc. Clip for earrings and the like. 3,987,644, Cl. 63-14.00D.
Sacks, Jacob M., to Northrop Corporation. Electro-optical tracking computer utilizing television camera. 3,988,534, Cl. 178-6.800.
Safety Sports Mirror Co.: *See—*
Chaney, David R.; and Wendel, David G., 3,988,058.
Sagami Chemical Research Center: *See—*
Kondo, Kiyosi; Negishi, Akira; and Tunemoto, Daiei, 3,988,380.
Saglio, Robert: *See—*
Blanc, Bernard; Boudou, Jean; Castaing, Alain; Clasquin, Jean; Gallet, Bernard; Saglio, Robert; and Samoel, Alain, 3,987,666.
Saito, Shigeru; Sasaki, Yutaka; Nakamura, Tomio; Moriya, Kiyoshi; Nakamura, Yoshimi; and Utsumi, Hiroshi, to Nitto Chemical Industry Co., Ltd. Catalyst for use in and process for preparing acrylonitrile. 3,988,359, Cl. 260-465.300.
Saito, Takeo, to Seiko Koki Kabushiki Kaisha. Exposure time indicating device for camera shutter. 3,988,750, Cl. 354-51.000.
Sakaguchi, Kahei; and Takemoto, Hirotaka, to Kao Soap Co., Ltd. Toner composition for use in electrophotography comprising novel polyester binder resin. 3,988,250, Cl. 252-62.10R.
Sakakibara, Shunpei: *See—*
Matsuda, Tetsuo; Watanabe, Susumu; Sakakibara, Shunpei; Munekata, Eisuke; Morikawa, Tadanori; Otani, Masaru; Noda, Toshiharu; Yamauchi, Hirose; Meguro, Tosio; and Kitazawa, Shuichi, 3,988,309.
Sakakibara, Yasuhito: *See—*
Ohrui, Tetsuya; Sakakibara, Yasuhito; Hoshikuma, Tetsuo; Imai, Osamu; and Iwasa, Masaaki, 3,988,423.
Sakamoto, Kuniaki: *See—*
Satake, Kunio; Wada, Takeshi; Sakamoto, Kuniaki; Harada, Hiroshi; and Sato, Yasushi, 3,988,275.
Sakata, Isao: *See—*
Higashiyama, Tatsuo; and Sakata, Isao, 3,988,482.
Sakurai, Yoshitoshi: *See—*
Sato, Yasuhito; Sakurai, Yoshitoshi; Inoue, Kazuo; and Yagi, Shizuo, 3,987,765.
Salimbeni, Aldo: *See—*
Manghisi, Elso; Salimbeni, Aldo; and Fregnan, Giancarlo, 3,988,475.
Salomon, Georges Pierre Joseph. Adjustable safety ski binding system. 3,987,553, Cl. 33-192.000.
Samoel, Alain: *See—*
Blanc, Bernard; Boudou, Jean; Castaing, Alain; Clasquin, Jean; Gallet, Bernard; Saglio, Robert; and Samoel, Alain, 3,987,666.
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Samole, Sidney: *See—*
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Samuel Moore and Company: *See—*
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Sanderson, Anne; Mosciano, Gerard; Pittet, Alan O.; Strasburger, Louis J.; Schreiber, William L.; Van Praag, Michel; Shuster, Edward J.; Rutkowsky, Bernard J.; and Evers, William J., to International Flavors & Fragrances Inc. Foodstuff flavoring compositions comprising alkylidene alkenals and processes for preparing same as well as flavoring compositions for use in such foodstuff. 3,988,487, Cl. 426-534.000.
Sandgren, Jan Erik, to Textron, Inc. Method and apparatus for manufacturing slide fastener stringer with improved fastening element count. 3,987,533, Cl. 29-410.000.
Sandoz Ltd.: *See—*
Carbonell, Jose; Hasler, Rolf; and Walliser, Roland, 3,987,808.
Schmid, Horst, 3,988,346.
Schneider, Rupert, 3,988,328.
Sanner, Axel: *See—*
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Santa Fe International Corporation: *See—*
Goren, Yoram; and Springett, Charles N., 3,987,640.
Santilli, Arthur A.; Scotese, Anthony C.; Bell, Stanley C.; and Rosenthale, Marvin E., to American Home Products Corporation. 1-Substituted-6-(2-substituted aminoethoxy)xanthen-9-ones. 3,988,335, Cl. 260-247.70T.
Sarantakis, Dimitrios, to American Home Products Corporation. (Tyr^3, Tyr^{14})-SRIF and intermediates. 3,988,308, Cl. 260-112.50R.
Sasaki, Yutaka: *See—*
Saito, Shigeru; Sasaki, Yutaka; Nakamura, Tomio; Moriya, Kiyoshi; Nakamura, Yoshimi; and Utsumi, Hiroshi, 3,988,359.
Satake, Kunio; Wada, Takeshi; Sakamoto, Kuniaki; Harada, Hiroshi; and Sato, Yasushi, to Asahi Kasei Kogyo Kabushiki Kaisha. Concentrated latex of synthetic rubbers and the method for the preparation thereof. 3,988,275, Cl. 260-23.00R.
Sato, Akira: *See—*
Hinata, Masanao; Takei, Haruo; Sato, Akira; and Ikeda, Tadashi, 3,988,155.
Hosokoshi, Kakuichiro; Nakamura, Hiroto; and Sato, Akira, 3,988,777.
Matsuyama, Junichi; Sato, Akira; Nakajima, Yosuke; and Nakazawa, Yoshiyuki, 3,988,513.
Sato, Masami; Hisada, Hiroshi; and Oguro, Tomokatsu, to Hitachi, Ltd. Magnetron with cathode end shields coated with secondary electron emission inhibiting material. 3,988,636, Cl. 315-39.510.
Sato, Mituru: *See—*
Takahashi, Tadashi; Onishi, Kazuo; Sato, Mituru; and Inamura, Junshiro, 3,988,654.
Sato, Yasuhito; Sakurai, Yoshitoshi; Inoue, Kazuo; and Yagi, Shizuo, to Honda Giken Kogyo Kabushiki Kaisha. Residual gas control apparatus for internal combustion engines having auxiliary combustion chambers. 3,987,765, Cl. 123-32.0SP.
Sato, Yasushi: *See—*
Satake, Kunio; Wada, Takeshi; Sakamoto, Kuniaki; Harada, Hiroshi; and Sato, Yasushi, 3,988,275.
Satoh, Tetsushi: *See—*
Shinozaki, Takashi; Kokufukata, Seigo; Nakagaki, Shintaro; and Satoh, Tetsushi, 3,988,776.
Sattelberg, Stanley E., to Chicago Bridge & Iron Company. Insulated tank. 3,987,925, Cl. 220-9.0LG.
Satterwhite, Charles R., to Unit Rig & Equipment Co. Outside supports for excavating wheels. 3,987,564, Cl. 37-190.000.
Satzinger, Roland. Safety system for the occupants of vehicles especially motor vehicles. 3,988,028, Cl. 280-748.000.
Sauer, Winfriede: *See—*
Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, executor; Vomel, Wolfgang; and Sauer, Winfriede, 3,988,460.
Saunders, Richard C.: *See—*
Miller, Norman C.; and Saunders, Richard C., 3,988,171.
Savage, Bobbie O. Extensible non-cranking wrench. 3,987,691, Cl. 81-57.300.
Savage, Harry A. Precision metering valve structure. 3,987,999, Cl. 251-205.000.
Sawabe, Eiichi: *See—*
Yanagimachi, Akio; Yamane, Hisakichi; Sawabe, Eiichi; Uehara, Takashi; Yoshino, Takehiko; Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Fukuda, Masaaki; and Kayano, Tatsuo, 3,988,528.
Sawada, Ryosaku, to Kabushiki Kaisha Hanshin Gijutsu Kenkyusho. Rotary engine. 3,987,762, Cl. 123-8.130.
Sawada, Takamasa: *See—*
Sone, Yoshiaki; and Sawada, Takamasa, 3,988,064.
Sbicca, Peter J. Method of making footwear. 3,987,510, Cl. 12-142.0EV.
Scanlon, Patricia Marie: *See—*
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 3,988,367.

Scantlin, John R., to Transaction Technology, Inc. Process of screen manufacture and use for coding credit cards. 3,987,725, Cl. 101-128.400.

Scantlin, John R., to Transaction Technology, Inc. Marking and sorting procedure. 3,988,015, Cl. 270-1.000.

Schaar, Charles H., to Colgate-Palmolive Company. Diaper with elastic crotch means. 3,987,794, Cl. 128-287.000.

Schady, Joseph L., to Alpha Sheet Metal Works, Inc. Cyclone apparatus. 3,988,133, Cl. 55-459.00R.

Schafer, Robert: *See—*
Ratz, Adolf; and Schafer, Robert, 3,987,543.

Schalit, Samuel: *See—*
Cutler, Royal A.; and Schalit, Samuel, 3,988,370.

Schapiro, Abraham. Preparation of water dispersible protein products. 3,988,511, Cl. 426-580.000.

Scharbach, Heinz; Engelhardt, Achim; and Bunz, Peter, to Sybron Corporation. Surgical implant and method for its production. 3,987,499, Cl. 3-1.910.

Schausberger, Helmut: *See—*
Wick, Richard; Pfeifer, Josef; and Schausberger, Helmut, 3,988,756.

Schering Corporation: *See—*
Weinstein, Marvin J.; Wagman, Gerald H.; and Marquez, Joseph A., 3,988,316.

Scherr, Albert E., III, to Sprague Electric Company. Method for recording potential capacity of a formed foil in a continuous foil forming process. 3,988,215, Cl. 204-28.000.

Scheuermann, Klaus. Mixing valve system. 3,987,819, Cl. 137-637.300.

Schiller Industries, Inc.: *See—*
Hayosh, Thomas D.; and Carosella, John H., 3,988,573.

Schirmer, Hermann: *See—*
Margotte, Dieter; Schirmer, Hermann; Ott, Karl-Heinz; Kampf, Gunther; Peilstocker, Gunter; and Vernaleken, Hugo, 3,988,389.

Schlein, Allen P. Surgically implantable total ankle prosthesis. 3,987,500, Cl. 3-1.910.

Schlesinger, Sheldon Irwin, to American Can Company. Light-sensitive material containing nitrone for forming heat-fixed images. 3,988,159, Cl. 96-88.000.

Schmechtig, Rune: *See—*
Koch, Kjell H. M.; and Schmechtig, Rune, 3,988,170.

Schmid, August, to Patentverwertungs-und Finanzierungsgesellschaft SERANIA AG. Bowling ball return mechanism. 3,988,023, Cl. 273-49.000.

Schmid, Erich: *See—*
Dorhofer, Gunther; Heckendorn, Roland; Schmid, Erich; Storni, Angelo; and Zust, Armin, 3,988,467.

Schmid, Horst, to Sandoz Ltd. Pyrazoline compounds useful as optical brighteners. 3,988,346, Cl. 260-310.00D.

Schmidt-Dunker, Manfred: *See—*
Ploger, Walter; Schmidt-Dunker, Manfred; and Gloxhuber, Christian, 3,988,443.

Schmidt, Erich A.; and Schmidt, Volker E., to Textron, Inc., a part interest. Apparatus for orienting and attaching fasteners to an article. 3,987,950, Cl. 227-116.000.

Schmidt, Felix Helmut: *See—*
Kampe, Wolfgang; Koch, Klaus; Stach, Kurt; Stork, Harald; and Schmidt, Felix Helmut, 3,988,317.

Schmidt, John P., to Oxirane Corporation. Preferential removal of metallic catalyst from epoxidation effluent. 3,988,353, Cl. 260-348.50L.

Schmidt, Volker E.: *See—*
Schmidt, Erich A.; and Schmidt, Volker E., 3,987,950.

Schmitt, Alfons: *See—*
Mattfeld, Johann; and Schmitt, Alfons, 3,988,695.

Schmitz, Ruth Y.: *See—*
Skoog, Folke; Schmitz, Ruth Y.; Hecht, Sidney M.; and Frye, Robert B., 3,988,338.

Schneider, Clayton J., Jr.: *See—*
Ruda, Ernest V.; Blickenstaff, John E.; and Schneider, Clayton J., Jr., 3,987,966.

Schneider, Rupert, to Sandoz Ltd. 5-Amino-2,3,7,8-tetrathiaalkane-1,9-dioic acids, esters and salts. 3,988,328, Cl. 260-247.10R.

Schneider, William P., to Upjohn Company, The. 8β-PGE_2 and related compounds. 3,988,361, Cl. 260-468.00D.

Schnizler, Albrecht, Jr.; and Holzwarth, Dietrich, to Metabowerke KG Closs, Rauch & Schnitzler. Motor speed control for power tool. 3,988,656, Cl. 318-345.000.

Schnur, Friedrich; Hibbel, Josef; and Cornils, Boy, to Ruhrchemie Aktiengesellschaft. Reactor for the production of oxygen containing compounds. 3,988,117, Cl. 23-285.000.

Schnurr, Michael W.: *See—*
Deen, Darrel B.; Hrdy, James E.; and Schnurr, Michael W., 3,987,562.

Schole, Murray L.; and Gubner, Richard S. Dental preparation. 3,988,434, Cl. 424-54.000.

Schosek, William O. Pipe guide means for a rod and pipe pusher. 3,988,003, Cl. 254-29.00R.

Schosek, William O. Drive jaws for a pipe and rod pusher device. 3,988,004, Cl. 254-29.00R.

Schreiber, William L.: *See—*
Sanderson, Anne; Mosciano, Gerard; Pittet, Alan O.; Strasburger, Louis J.; Schreiber, William L.; Van Praag, Michel; Shuster, Edward J.; Rutkowsky, Bernard J.; and Evers, William J., 3,988,487.

Schreyer, Warren C.: *See—*
Weeks, Douglas H.; Bond, David A.; Schreyer, Warren C.; and Bloodworth, John M., 3,987,919.

Schrock, Richard Royce, to Du Pont de Nemours, E. I., and Company. Hydrocarbylidene compounds of niobium and tantalum. 3,988,332, Cl. 260-429.00R.

Schubert, Alvin L.: *See—*
McNair, David D.; and Schubert, Alvin L., 3,988,063.

Schuhmann, Reinhardt, Jr.: *See—*
Queneau, Paul E.; and Schuhmann, Reinhardt, Jr., 3,988,148.
Queneau, Paul E.; and Schuhmann, Reinhardt, Jr., 3,988,149.

Schuierer, Manfred, to Bruckner Apparatebau GmbH. Process of dyeing and finishing textile material. 3,988,109, Cl. 8-94.00R.

Schultz, Edward G., Jr.: *See—*
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Schulz-Walz, Hansjochen: *See—*
Alberts, Heinrich; Schulz-Walz, Hansjochen; Bartl, Herbert; Goerden, Leonhard; and Schuster, Klaus, 3,988,388.

Schulze, Reinhold, to Norddeutsche Affinerie. Method of preventing the supersaturation of electrolyte solutions with one or more of the impurities arsenic, antimony and bismuth, in the electrolytic refining of nonferrous metals, especially copper. 3,988,225, Cl. 204-130.000.

Schumann, John Louis. Electrostatic precipitator apparatus and method. 3,988,127, Cl. 55-13.000.

Schurmann, Joe H., to Texas Instruments Incorporated. Automatic tuning system. 3,988,681, Cl. 325-470.000.

Schuster, Klaus: *See—*
Alberts, Heinrich; Schulz-Walz, Hansjochen; Bartl, Herbert; Goerden, Leonhard; and Schuster, Klaus, 3,988,388.

Schuster, Wilhelm, to Griso-Chemie AG. Hair curler. 3,987,805, Cl. 132-40.000.

Science Union et Cie, Societe Francaise de Recherche Medical: *See—*
Malen, Charles; Desnos, Monique; Laubie, Michel; and Poignant, Jean-Claude, 3,988,464.

Sciulli, Joseph Albert, to Communications Satellite Corporation (Comsat). Frame synchronization in speech predictive encoded communication system. 3,988,674, Cl. 179-15.0BS.

SCM Corporation: *See—*
Diamond, Herrick R., 3,987,885.
Johnson, Lawrence A., 3,988,512.

Scofield, Bruce A., to International Harvester Company. Timer means for sequential fuel injection. 3,987,764, Cl. 123-32.0EA.

Scotese, Anthony C.: *See—*
Santilli, Arthur A.; Scotese, Anthony C.; Bell, Stanley C.; and Rosenthale, Marvin E., 3,988,335.

Scott, Charles E., to P. R. Mallory & Co., Inc. Timed switching circuit. 3,988,727, Cl. 340-309.100.

Scott, John B.; Whang, Sang Y.; Ragsdale, Robert G.; and Chiu, Ran-Fun, to Milgo Electronic Corporation. Integrated circuit modem with a memory storage device for generating a modulated carrier signal. 3,988,540, Cl. 178-67.000.

Scovill Manufacturing Company: *See—*
Foults, Jonathan Asa, 3,987,876.

Sedlatschek, Robert Louis: *See—*
Wurst, John Whilldin; Hauf, Robert Conrad; Sedlatschek, Robert Louis; and Garron, Stephen Alexander, 3,987,739.

Segoshi, Kenji; Kidogami, Toshio; and Yamaba, Chinzo, to Kanebo, Ltd. Process for coloring fibrous structures. 3,988,108, Cl. 8-18.00R.

Seiden, Paul, to Procter & Gamble Company, The. Toilet bars. 3,988,255, Cl. 252-107.000.

Seiko Koki Kabushiki Kaisha: *See—*
Saito, Takeo, 3,988,750.

Seki, Kunio, to Hitachi, Ltd. Complementary push-pull amplifier device with protective circuit means. 3,988,693, Cl. 330-207.00P.

Seki, Shigeo; Sugimoto, Shingo; and Nakajima, Shokichi, to Meiji Seika Kaisha, Ltd. Process for N-acylation of 7 amino cephem compounds. 3,988,326, Cl. 260-243.00C.

Sekisui Kagaku Kogyo Kabushiki Kaisha: *See—*
Ueda, Harutoshi; Suzuki, Naoyuki; and Nagao, Masami, 3,988,402.

Sekisui Kaseihin Kogyo Kabushiki Kaisha: *See—*
Matsui, Takashi, 3,988,191.

Selden, Edward B., III: *See—*
Slough, Carlton M.; and Selden, Edward B., III, 3,988,663.

Sellman, Donald L. Wind motors. 3,988,072, Cl. 415-3.000.

Senn, Siegfried, to Fahrni Institute Ltd. Variation of binder content in the core layer. 3,988,183, Cl. 156-62.800.

Seragnoli, Enzo, to G. D Societa Per Azioni. Device for depositing controlled amounts of adhesive substances. 3,987,753, Cl. 118-212.000.

Serizawa, Yoshio; and Fujiwara, Yasuhiko, to Nissan Motor Co., Ltd. Vehicle driver protecting steering arrangement. 3,988,027, Cl. 280-87.00C.

Serr, Georg; and Gobauer, Franz, to Rheinpfalzische Blechemballagenfabrik G. Schonung & Co. KG. Bead joint. 3,987,927, Cl. 220-67.000.

Serres, Bernard M.: *See—*
Merlin, Jean C.; and Serres, Bernard M., 3,988,549.

Seubert, Juergen: *See—*
Rogalski, Werner; Kirchlechner, Richard; Seubert, Juergen; Gottschlich, Rudolf; Hameister, Walter; Bergmann, Rolf; and Wahlig, Helmut, 3,988,468.

Shabalin, Alexandr Sergeevich: *See—*
Kuzavkov, Nikolai Grigorievich; Pakhomov, Vladimir Vasilievich; Prin, Ivan Ivanovich; and Shabalin, Alexandr Sergeevich, 3,988,203.

Shalavina, Elena Leonidovna; Ponomareva, Elizaveta Ivanovna; Zazubin, Arkady Ivanovich; Ostapenko, Tatyana Dmitrievna; Ivanova, Galina Artemievna; Romanov, Gennady Alexeevich; Bespalov, Evgeny Nikolaevich; Prokopov, Igor Vladimirovich; Povazhny, Boris Stepanovich; Smirnov, Boris Alexeevich; Vasiliev, Viktor Nikolaevich; Turakbaev, Salavat Ishanovich; Kunaev, Askar Minliakhmedovich; Tursunbaev, Turar Baltabaevich; and Ponomarev, Viktor Dmitrievich, deceased (by Ponomareva, Elizaveta Ivanovna, administratrix). Process for extraction of gallium from sodium aluminate liquors. 3,988,150, Cl. 75-109.000.

Shannon, Gordon Brian Roger: *See—*
Andrews, Jeremy Charles; and Shannon, Gordon Brian Roger, 3,987,729.

Shapiro, Eugene: *See—*
Fan, George J.; and Shapiro, Eugene, 3,988,739.

Shapiro, Frederick M.: *See—*
Kamins, Seymour; and Shapiro, Frederick M., 3,987,958.

Sharpe, Claude A., to Bendix Corporation, The. Phase lock detector for digital frequency synthesizer. 3,988,696, Cl. 331-1.00A.

Shatila, Mounir A. Process for producing texturized dehydrated potato rice and related products. 3,988,484, Cl. 426-99.000.

Shay, Joseph Leo: *See—*
Bachmann, Klaus Jurgen; Buehler, Ernest; Shay, Joseph Leo; and Wagner, Sigurd, 3,988,172.

Shea, Philip J.: *See—*
Abdallah, Abdulmuniem H.; and Shea, Philip J., 3,988,474.

Shearer, David: *See—*
Shearer, David, Sr.; and Shearer, David, 3,987,944.

Shearer, David, Sr.; and Shearer, David. Bicycle-mounted baseball bat and ball carrier. 3,987,944, Cl. 224-37.000.

Shelby, Thomas A.; and Gallien, Shelby W., to Rea Magnet Wire Co., Inc. Wire enamel with low soldering temperature. 3,988,251, Cl. 252-63.700.

Shelby, Thomas A.; and Gallien, Shelby W., to Rea Magnet Wire Co., Inc. Wire enamel with low soldering temperature. 3,988,283, Cl. 260-33.40P.

Shell Oil Company: *See—*
Anderson, Victor F., 3,988,186.
Harlan, James T., Jr., 3,988,394.
Harrison, Tony; and Weatherhead, Roger G., 3,988,257.
Harrow, Geoffrey A.; Mills, Walter D.; Wilson, John L.; and Finlay, Ian C., 3,987,773.
Rochling, Hans F. W.; Buchel, Karl-Heinz; and Korte, Friedrich W.A.G.K., 3,988,465.
Tham, Min Jack, 3,987,851.
Werzner, William F.; and Aderholt, Paul J., 3,988,264.

Shelton, Robert Q.: *See—*
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Shemtov, Sami, to I-T-E Imperial Corporation EFCOR Division. Assembling apparatus. 3,987,532, Cl. 29-234.000.

Sherwood, Henry A. Apparatus to control the direction of movement of a mechanism. 3,988,655, Cl. 318-257.000.

Sheth, Narottam Vrajlal. Skewer assembly. 3,987,977, Cl. 242-130.400.

Shevekov, Serge: *See—*
Keever, Robert E.; Broman, Randolph; and Shevekov, Serge, 3,987,991.

Shibata, Akira: *See—*
Nakagawa, Isao; Shibata, Akira; and Murakami, Toshio, 3,988,775.

Shibata, Hiroshi; Okazaki, Isao; and Kokubu, Yoshikazu, to Kureha Kagaku Kogyo Kabushiki Kaisha. Vertical diaphragm type electrolytic apparatus for caustic soda production. 3,988,235, Cl. 204-266.000.

Shibutami, Hirohiko: *See—*
Itoh, Yasuo; Suzuki, Yoshitake; Shibutami, Hirohiko; Hirano, Koichi; and Tagami, Muneo, 3,987,841.

Shibuya, Toshio: *See—*
Iijima, Tetsuya; and Shibuya, Toshio, 3,987,864.

Shields, Orin Alvin: *See—*
Moore, Danny Raymond; and Shields, Orin Alvin, 3,987,968.

Shih, Kelvin, to Shih, Kelvin. Power amplifier. 3,988,691, Cl. 330-15.000.

Shimada, Shunji, to Hitachi, Ltd. Driver circuit for liquid crystal display using insulated gate FETs. 3,988,616, Cl. 307-270.000.

Shimano, Takashi: *See—*
Orimo, Katsumi; Azuma, Masao; Shimano, Takashi; and Yamamoto, Shoji, 3,988,404.

Shimizu, Kenji; Nakaishi, Junzo; and Yamamoto, Kazuya, to Daihatsu Kogyo Company Limited. Non-contact vane pump. 3,988,083, Cl. 418-264.000.

Shimizu, Masanao: *See—*
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Shimizu, Noboru: *See—*
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Shimizu, Takeshi: *See—*
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Shimizu, Toshio: *See—*
Hashimoto, Hiroshi; Suga, Kiyomitsu; and Shimizu, Toshio, 3,988,515.

Shimokawa, Noriaki: *See—*
Nishimura, Haruki; Uno, Hitoshi; Natsuka, Kagayaki; Shimokawa, Noriaki; Shimizu, Masanao; and Nakamura, Hideo, 3,988,456.

Shinbata, Takashi: *See—*
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Shinoda, Toshihiko: *See—*
Moriga, Hiroyuki; Morishita, Tadao; Shinoda, Toshihiko; and Takahashi, Isamu, 3,988,292.

Shinozaki, Takashi; Kokufukata, Seigo; Nakagaki, Shintaro; and Satoh, Tetsushi, to Victor Company of Japan, Limited. System for controlling excessive incident light in color television cameras. 3,988,776, Cl. 358-41.000.

Shinshu Seiki Kabushiki Kaisha: *See—*
Endo, Takeshi; Mitsui, Yoshihiro; and Kamakura, Hiroshi, 3,988,652.

Shinto Paint Co., Ltd.: *See—*
Minami, Giichi; Manabe, Yukihiro; and Suematsu, Yasuo, 3,988,281.

Shiosaka, Makoto, to Hayashibara Biochemical Laboratories, Incorporated. Heat stable cyclodextrin glycosyltransferase. 3,988,206, Cl. 195-62.000.

Shiotsuki, Kenichi: *See—*
Naoi, Mitsuaki; Kishida, Chozo; and Shiotsuki, Kenichi, 3,987,680.

Shirotsuka, Mikio: *See—*
Yaguchi, Masachika; Jinnai, Toshio; Shirotsuka, Mikio; and Totani, Kazuo, 3,988,054.

Shockley, James E., Jr., to Union Aviation, Inc (Entire). Portable aircraft hand controls. 3,987,986, Cl. 244-83.00F.

Shreve, James D., Jr.; Trowsdale, Larry S.; and Hill, Adare, to Kerr-McGee Nuclear Corporation. Method and apparatus for indicating the radioactive decay products of radium in an environment. 3,988,587, Cl. 250-364.000.

Shurgan, Joel; Northrop, Donald P.; and Coplein, Gordon D., to Duro-Test Corporation. Fluorescent lamp with envelope grooves. 3,988,633, Cl. 313-493.000.

Shuster, Edward J.: *See—*
Hall, John B.; Tseng, Ching Y.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 3,987,803.
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Shvets, Grigory Iosifovich: *See—*
Naratov, Alexei Mikhailovich; Legostaev, Valery Leonidovich; Gusev, Boris Sergeevich; Nadzharov, Oleg Eduardovich; Osipov, Valentin Ivanovich; Anisimov, Viktor Vasilievich; Muratov, Enver Osmanovich; Tarasov, Ivan Ivanovich; Badenkov, Petr Fedorovich; Kepersha, Ljudvig Mikhailovich; Ionov, Valentin Alexandrovich; Drozdov, July Prokofievich; Shvets, Grigory Iosifovich; Kruglov, Ivan Ivanovich; and Leontiev, Mikhail Dmitrievich, 3,988,077.

Sidor, Edward Frank; and Desio, Frank B., to Illinois Tool Works Inc. Contactless linear rotary potentiometer. 3,988,710, Cl. 338-32.00R.

Sieczkiewicz, Robert A. Cutting guide for layered cake. 3,987,541, Cl. 30-114.000.

Siemens Aktiengesellschaft: *See—*
Fritze, Franz, 3,988,650.
Keller, Wolfgang, 3,988,197.
Lange, Gottfried; and Reiss, Karl Hans, 3,988,584.
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Muller, Willi; Freygang, Hans-Joachim; and Kovacs, Gabor, 3,988,684.
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Siepermann, Walter: *See—*
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Sierakowski, John F.: *See—*
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Sieverin, Walter Joseph: *See—*
Urso, Patrick Francis; Van Alsburg, Earl Roger; and Sieverin, Walter Joseph, 3,988,182.

Sifniades, Stylianos; Boyle, William J., Jr.; and Van Peppen, Jan F., to Allied Chemical Corporation. Single stage resolution/racemization of α-amino-ε-caprolactam. 3,988,320, Cl. 260-239.30R.

Silver, Stanley Milton, to Paxall, Inc. Formation of laminated packaging blanks. 3,987,711, Cl. 93-36.600.

Simonovitch, Chaim: *See—*
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Singer Company, The: *See—*
Wurst, John Whilldin; Hauf, Robert Conrad; Sedlatschek, Robert Louis; and Garron, Stephen Alexander, 3,987,739.

Singer, Frederick William: *See—*
Manning, Donald Franklin; Singer, Frederick William; and Student, Joseph James, 3,987,949.

Singh, Gurdev, to General Electric Company. Poly-V-belt and pulley mechanism. 3,987,683, Cl. 74-229.000.

Sinn, Hartmut; and Stallmann, Hans, to Heraeus-Christ GmbH. Centrifuge bag for treatment of biological liquids. 3,987,961, Cl. 233-27.000.

Sioux Steam Cleaner Corporation: *See—*
Finger, John F., 3,987,811.

Sitter, Matthew M.: *See*—
Kutch, Edward F.; Meyers, Robert M.; and Sitter, Matthew M., 3,988,276.

Skarbo, Roald R.; and Natwig, David L., to Kennecott Copper Corporation. Liquid ion exchange process for the recovery of copper and nickel. 3,988,151, Cl. 75-119.000.

SKF Industrial Trading and Development Company, B.V.: *See*—
Kufner, Walter, 3,988,047.

Sklarchuk, Jack C., to ESB Incorporated. Sodium-mixture of metal halides, sulfur battery. 3,988,163, Cl. 429-103.000.

Skoog, Folke; Schmitz, Ruth Y.; Hecht, Sidney M.; and Frye, Robert B., to Wisconsin Alumni Research Foundation. 4-Substituted amino-2-substituted thio-pyrrolo-[2,3-d]pyrimidine derivatives. 3,988,338, Cl. 260-256.50R.

Slahetka, Chester Robert: *See*—
Hillmer, Roy Wayne; Morrone, Nicholas Francis; and Slahetka, Chester Robert, 3,988,199.

Slator, Damon T.; Peil, Archie W.; and Bishop, Thomas R., to Bowen Tools, Inc. Hydromechanical drilling jar. 3,987,858, Cl. 175-297.000.

Slob, Arie, to U.S. Philips Corporation. Display device for a counting mechanism, such as a clock or watch. 3,987,617, Cl. 58-50.00R.

Slough, Carlton M.; and Selden, Edward B., III, to Texaco Inc. Locator for metallic pipe with AC signals impressed. 3,988,663, Cl. 324-3.000.

Small, Byron Lee: *See*—
Bloxham, Gordon Foreman; Brezeale, Claude Paren; Cocco, Eugene Raymond; Hardesty, Edwin Charles; Small, Byron Lee; and Steinert, Daniel Marion, 3,988,092.

Smilgys, Bruno S., to Veeder Industries, Inc. Presettable counter mechanism. 3,988,576, Cl. 235-144.0DM.

Smirnov, Boris Alexeevich: *See*—
Shalavina, Elena Leonidovna; Ponomareva, Elizaveta Ivanovna; Zazubin, Arkady Ivanovich; Ostapenko, Tatyana Dmitrievna; Ivanova, Galina Artemievna; Romanov, Gennady Alexeevich; Bespalov, Evgeny Nikolaevich; Prokopov, Igor Vladimirovich; Povazhny, Boris Stepanovich; Smirnov, Boris Alexeevich; Vasiliev, Viktor Nikolaevich; Turakbaev, Salavat Ishanovich; Kunaev, Askar Minliakhmedovich; Tursunbaev, Turar Baltabaevich; and Ponomarev, Viktor Dmitrievich, deceased, 3,988,150.

Smith, Edwin J.: *See*—
Austin, Lowell W.; Smith, Edwin J.; and McGraw, Leslie D., 3,988,216.

Smith, Frank Patterson, 2nd: *See*—
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Smith, Harry: *See*—
Buckle, Derek Richard; and Smith, Harry, 3,988,476.

Smith, Horace L., Jr., to Smitherm Industries, Inc. System for heat-exchange of heat transfer liquid with steam in papermaking installations. 3,988,200, Cl. 162-290.000.

Smith, Horace L., Jr., to Smitherm Industries, Inc. System for heating dryers and generating steam in papermaking installations. 3,988,201, Cl. 162-290.000.

Smith International, Inc.: *See*—
Carl, Joseph A.; Steinke, John F.; and Bloss, David M., 3,987,856.

Smith, Irving. Collapsible display stand. 3,987,737, Cl. 108-111.000.

Smith, James E., to Mettler Instrumente AG. Apparatus for nullifying the effects of angular acceleration of frames tiltably mounting balance beams and the like. 3,987,861, Cl. 177-184.000.

Smith, Kenneth L.: *See*—
Miller, Howard A.; Smith, Kenneth L.; and Stacy, Peter M., 3,987,728.

Smith, Lewis V., Jr.; and Miller, Norman P., to Communications Satellite Corporation (Comsat). Steerable feed for toroidal antennas. 3,988,736, Cl. 343-761.000.

Smith, Robert D.; and Upchurch, William B. Process for forming thin walled articles or thin sheets. 3,988,405, Cl. 264-63.000.

Smith, Terry D.: *See*—
Richards, Powell; and Smith, Terry D., 3,988,429.

Smith, Thomas M., to Monarch Marking Systems, Inc. Label roll package. 3,987,897, Cl. 206-226.000.

Smitherm Industries, Inc.: *See*—
Smith, Horace L., Jr., 3,988,200.
Smith, Horace L., Jr., 3,988,201.

SmithKline Corporation: *See*—
Dunn, George L., 3,988,451.
Hill, Harlan F.; and Lafferty, John J., 3,988,457.
Kaiser, Carl; and Pendleton, Robert G., 3,988,339.

Smrt, Thomas J. Modular structural assembly and method of construction. 3,987,597, Cl. 52-495.000.

Smyth, Nicholas P. D.: *See*—
Purdy, David L.; Magovern, George J.; and Smyth, Nicholas P. D., 3,987,799.

Snijders, Wilfred Andre Maria: *See*—
Eggermont, Ludwig Desire Johan; Van Essen, Hendrik Arie; Van Gerwen, Petrus Josephus; and Snijders, Wilfred Andre Maria, 3,988,607.

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Burgess, Billy; McGilvery, Washington I.; Michael, John R.; Snyder, Robert P.; Burgess, John Henry, deceased; and Burgess, Norma Lou, administratrix, 3,987,902.

Societa Italiana Telecomunicazioni Siemens S.p.A.: *See*—
Cicognani, Enrico; Caldarella, Riccardo; Antonini, Athos; and Lamartina, Alfonso, 3,988,547.

Societe Anonyme de Telecommunications: *See*—
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Societe Anonyme dite: J. Sabes & Cie: *See*—
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Societe Anonyme dite: L'Oreal: *See*—
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Zviak, Charles; and Ghilardi, Giuliana, 3,988,110.

Societe Anonyme: Poclain: *See*—
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S.A. Texaco Belgium N.V.: *See*—
Dulog, Lothar G., 3,988,381.

Societe de Vente de l'Aluminium Pechiney: *See*—
Bouvaist, Jean Marie Amedee, 3,988,180.
Figueres, Roger; and Pitaval, Antoine, 3,987,536.

Societe d'Etudes de Machines Speciales: *See*—
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Societe ECA: *See*—
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Societe Industrielle Honeywell Bull: *See*—
Prival, Guy; Hennequin, Jacques Michel; and Brette, Yves-Jean Francois, 3,988,657.

Soderstrom, Melvin Andrew: *See*—
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Sola Basic Industries, Inc.: *See*—
Mendelsohn, Melvin D.; and Klima, William G., 3,988,106.

Solomon, Elias E.: *See*—
Reiss, Martin H.; and Solomon, Elias E., 3,988,726.

Sone, Yoshiaki; and Sawada, Takamasa, to Canon Kabushiki Kaisha. Reader-printer. 3,988,064, Cl. 355-41.000.

Sony Corporation: *See*—
Ishigaki, Yoshio; and Okada, Takashi, 3,988,598.
Ishigaki, Yoshio; and Okada, Takashi, 3,988,692.
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Southern Railway Company: *See*—
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Southwire Company: *See*—
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Spangler, Edwin L., Jr.: *See*—
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Spapens, Johannes Anthonius Maria: *See*—
Koster, Marinus Pieter; and Spapens, Johannes Anthonius Maria, 3,987,645.

Sparks, Bryan D.: *See*—
Meadus, Frederick Weldon; Sparks, Bryan D.; and Puddington, Ira E., 3,987,730.

Spatz, Sydney M., to Mead Corporation, The. Pressure sensitive copy paper employing pyrazoloxanthene compounds. 3,988,492, Cl. 428-323.000.

Spectra-Physics, Inc.: *See*—
Crane, Dale E.; Jones, Robert E.; and Meneses, Hector A., 3,988,698.

Speer, Billy L.: *See*—
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Sperry, John D., to Arvin Industries, Inc. Simplified precision tape cassette and system. 3,987,980, Cl. 242-199.000.

Sperry Rand Corporation: *See*—
Kochel, Le Roy J.; and Lins, Stanley J., 3,988,723.
Mahoney, Frank A.; and Hutley, Ronald W. F., 3,987,723.
Mahoney, Frank A.; and Hutley, Ronald W. F., 3,987,886.
Merritt, John H., 3,987,890.

Spisak, Edward G. Trim ring assembly. 3,988,039, Cl. 301-37.00B.

Spisak, Edward G. Wheel trim assembly. 3,988,040, Cl. 301-37.00B.

Spitzer, Wayne A.; and Wright, Ian G., to Eli Lilly and Company. 7-Carboxy or 2,2,2-trichloroethoxy carbonyl- cephalosporins. 3,988,325, Cl. 260-243.00C.

Spivack, John D.; and Dexter, Martin, to Ciba-Geigy Corporation. 2,4,6-Trialkyl L-3-hydroxyphenylalkanoates. 3,988,363, Cl. 260-473.00S.

Spraggs, Richard William; and Gladden, Ernest Laird, to Ensign-Bickford Company, The. Non-electric double delay borehole downline unit for blasting operations. 3,987,732, Cl. 102-27.00R.

Spraggs, Richard William; and Gladden, Ernest Laird, to Ensign-Bickford Company, The. Millisecond delay surface connector. 3,987,733, Cl. 102-27.00R.

Sprague Electric Company: *See*—
Maher, Galeb H., 3,988,498.
McGrath, N. Christian, 3,988,518.
Scherr, Albert E., III, 3,988,215.

Sprague, Robert A., to Itek Corporation. Method and apparatus for detecting cosmetic defects in opthalmic lenses. 3,988,068, Cl. 356-124.000.

Sprecher & Schuh AG: *See*—
Graf, Rudolf; Heutschi, Hans; Lang, Ernst; Stephanides, Viktor; Thaler, Richard; and Wuthrich, Hans-Rudolf, 3,988,554.
Hentschel, Michael; and Unterweger, Heinz, 3,988,641.

Sprenkle, George Joseph: *See*—
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Springer, Colby M., to Circle Seal Corporation. Solenoid actuating mechanism with variable rate energy storing means. 3,988,706, Cl. 335-264.000.

Springett, Charles N.: *See—*
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Sta-Rite Industries, Inc.: *See—*
Brooks, Gary L., 3,988,244.

Stach, Kurt: *See—*
Kampe, Wolfgang; Koch, Klaus; Stach, Kurt; Stork, Harald; and Schmidt, Felix Helmut, 3,988,317.

Stach, Kurt, deceased: *See—*
Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, executor; Vomel, Wolfgang; and Sauer, Winfriede, 3,988,460.

Stacy, Peter M.: *See—*
Miller, Howard A.; Smith, Kenneth L.; and Stacy, Peter M., 3,987,728.

Stahl, Margarete. Method and apparatus for packaging smeltable or fluid material. 3,987,602, Cl. 53-25.000.

Stahlecker, Fritz; and Stahlecker, Hans. Method and apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine. 3,987,610, Cl. 57-34.00R.

Stahlecker, Hans: *See—*
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Stain, S. Douglas, Jr.: *See—*
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Standard Oil Company (Indiana): *See—*
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Stanley, Robert W.: *See—*
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Stannard, Forrest B. Aeration tubing system. 3,988,396, Cl. 261-124.000.

Starcevic, Mihailo, to BBC Brown Boveri & Company Limited. Dynamo-electric machine with prestressed laminated stator component. 3,988,622, Cl. 310-91.000.

Starp, Franz W. R.: *See—*
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Staub, Roger Brown: *See—*
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Stauffer Chemical Company: *See—*
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Steckmann, George L.: *See—*
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Stedman, Robert Norris: *See—*
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Stegmeier, William J. Apparatus for confining a form board against a wall. 3,987,997, Cl. 249-207.000.

Stein, Dieter: *See—*
Wurmb, Rolf; Kunde, Joachim; Stein, Dieter; Gausepohl, Hermann; and Theysohn, Rainer, 3,988,284.

Stein, Werner: *See—*
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Steinert, Daniel Marion: *See—*
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Steinke, John F.: *See—*
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Stellwagen, Frank W.: *See—*
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Steltenkamp, Robert John, to Colgate-Palmolive Company. Flavor and fragrant compositions. 3,988,432, Cl. 424-49.000.

Stenkvist, Sven-Einar, to Allmanna Svenska Elektriska Aktiebolaget. Direct current arc furnace with charging means. 3,988,525, Cl. 13-11.000.

Stephan, John T.; and Stephan, Kurt F. Gelled proteinaceous fish bait and process of preparing same. 3,988,479, Cl. 426-1.000.

Stephan, Kurt F.: *See—*
Stephan, John T.; and Stephan, Kurt F., 3,988,479.

Stephanides, Viktor: *See—*
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Stephenson, Martin, to Ethicon, Inc. Antimicrobial sutures. 3,987,797, Cl. 128-335.500.

Sterling Drug Inc.: *See—*
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Stol, Miroslav; Stoy, Vladimir; and Tuzar, Zdenek, to Ceskoslovenska akademie ved. Method of producing soluble glycol methacrylate or glycol acrylate polymers and copolymers containing a minor amount of diester crosslinking comonomers. 3,988,305, Cl. 526-79.000.

Stol, Miroslav: *See—*
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Stoller, Frederick L., to Phillips Petroleum Company. Laminates of a polymeric film and a nonwoven fabric. 3,988,519, Cl. 428-15.000.

Stork Amsterdam B.V.: *See—*
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Stork, Harald: *See—*
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Story Chemical Corporation: *See—*
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Stoy, Artur; Stol, Miroslav; Stoy, Vladimir; and Zima, Jiri, to Ceskoslovenska akademie ved. Tendon prosthesis. 3,987,497, Cl. 3-1.000.

Stoy, Vladimir: *See—*
Stol, Miroslav; Stoy, Vladimir; and Tuzar, Zdenek, 3,988,305.
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Strader, James W. Fishing lure. 3,987,576, Cl. 43-42.160.

Strange, Donald R.: *See—*
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Strasburger, Louis J.: *See—*
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Strassberger, Werner: *See—*
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Strassheimer, Herbert, to GNK Windsor G.m.b.H. Device for opening and closing a mold in a molding machine. 3,987,705, Cl. 91-416.000.

Street, Graham Stewart Brandon. Digitizing of recorded data. 3,988,610, Cl. 250-202.000.

Strick, Carl Edwin: *See—*
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Strickland, Charles Irvin: *See—*
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Strickland, Robert George: *See—*
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Stuard, Charles Donald: *See—*
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Stuart, Travis P.; and Tipton, Wilbur J., to United States of America, Energy Research and Development Administration. Combination neutron-gamma ray detector. 3,988,586, Cl. 250-367.000.

Student, Joseph James: *See—*
Manning, Donald Franklin; Singer, Frederick William; and Student, Joseph James, 3,987,949.

Stuhler, William B.: *See—*
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Sturmer, David M., to Eastman Kodak Company. Photographic supports and elements utilizing photobleachable omicron-nitroarylidene dyes. 3,988,154, Cl. 96-48.00R.

Sturmer, David M., to Eastman Kodak Company. Photographic supports and elements utilizing photobleachable o-nitroarylidene dyes. 3,988,156, Cl. 96-84.00R.

Suematsu, Yasuo: *See—*
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Suga, Kiyomitsu: *See—*
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Sugimoto, Shingo: *See—*
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Sullivan, Dennis W., to Parker-Hannifin Corporation. Method of constructing a hose. 3,988,189, Cl. 156-143.000.

Sullivan, Thomas James; and Kingsley, Patrick John, to Fisons Limited. Method of lowering plasma uric acid levels. 3,988,469, Cl. 424-283.000.

Sultan, Stig Bertil, to Aktiebolaget Original-Odhner. Printing ink supply device for ink jet printer. 3,988,745, Cl. 346-140.00R.

Sumida, Takuji: *See*—
Dohi, Michio; Sumida, Takuji; and Yokobori, Katsuichi, 3,988,506.

Sumitomo Chemical Company, Limited: *See*—
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Sumitomo Metal Industries, Ltd.: *See*—
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Sumrell, Gene: *See*—
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Sun Sports Corporation of America: *See*—
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Sundstrand Data Control, Inc.: *See*—
Bateman, Charles Donald, 3,988,713.

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Susuki, Rinnosuke; Toyoda, Sadao; and Endo, Keiji, to Lion Fat & Oil Co., Ltd. Process for recovering alkyl sulfonic acid from photosulfoxidation reaction mixture. 3,988,218, Cl. 203-39.000.

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Suvitie, Aimo Jarmo Juhani; and Suvitie, Seppo Juhani. Curtain board. 3,987,515, Cl. 16-94.00D.

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Suzuki, Yoshitake: *See*—
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Svensson, Lars. Posts. 3,987,593, Cl. 52-98.000.

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Swatty, Eugene E.; and Lyth, William Wilson, to Fluid Controls, Inc. Combined sensor and control. 3,987,625, Cl. 60-431.000.

Swengel, Robert Charles, Sr.; and Crumley, J. A., to AMP Incorporated. Welding method and means using foil electrode. 3,988,563, Cl. 219-104.000.

Swenson, Henry F. Heavy-duty live centers. 3,987,693, Cl. 82-33.00R.

Swenson, Richard M., to United States of America, Navy. System for random, time accurate access to recorded material. 3,988,778, Cl. 360-72.000.

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Teumer, Roger G.; Jackson, Earl V.; Hermanson, Herman A.; and Baldwin, Le Roy, to Xerox Corporation. Bead bypass speed reduction. 3,988,060, Cl. 355-3.00P.
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Tucci, John James, to AMP Incorporated. Fixture and jig for use in connecting wires to connectors. 3,987,531, Cl. 29-203.0MW.

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Twedell, Jack L. Slip-joint coupling, method of installing same and frame subassembly for use therewith. 3,988,030, Cl. 285-183.000.

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Ueda, Harutoshi; Suzuki, Naoyuki; and Nagao, Masami, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Non-combustible molding material. 3,988,402, Cl. 264-42.000.

Uehara, Takashi: *See—*
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Uhrich, Richard, to United States of America, Navy. Depth insensitive accumulator for undersea hydraulic systems. 3,987,708, Cl. 92-134.000.

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Ulsh, John R. Power saw holder. 3,988,125, Cl. 51-98.00R.

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Vyzkumny ustav chemickych zarizeni: *See—*
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Walrave, Jean; and Champiot, Jean, to Ugine Carbone. Anti-skid stud for pneumatic vehicle tires. 3,987,831, Cl. 152-210.000.

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Wanesky, William R., to Western Electric Company, Inc. Apparatus for transferring an oriented array of articles. 3,988,196, Cl. 156-541.000.

Wang, Donald G. J., to Aqua-Chem, Inc. Anisotropic polyvinyl formal resin microporous membrane and its preparation. 3,988,245, Cl. 210-500.00M.

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Wankel, Felix, to Wankel, Felix; and Hutzenlaub, Ernst. Radial piston engine. 3,987,758, Cl. 123-8.090.

Ward, James F.: *See—*
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Warman, Bloomfield James; and Walker, Stephen Sidney, to GTE International Incorporated. Storage of information. 3,988,580, Cl. 235-153.0AM.

Warren, Noel Macon, to Teledyne Exploration Company. Method and apparatus for hydrophone streamer manufacture. 3,987,537, Cl. 29-592.000.

Wasa, Kiyotaka; Ohji, Kenzo; Yamazaki, Osamu; and Hayakawa, Shigeru, to Matsushita Electric Industrial Co., Ltd. Method of making crystal films. 3,988,232, Cl. 204-192.000.

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Wason, Satish K., to J. M. Huber Corporation. Amorphous precipitated silica products and method for their production. 3,988,162, Cl. 106-288.00B.

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Watanabe, Susumu: *See—*
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Watanabe, Terumoto; Nagata, Masato; Fukui, Shigeo; and Okamura, Manabu, to Tokyo Shibaura Electric Co., Ltd. Turntable apparatus. 3,988,024, Cl. 274-1.00E.

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Watson, Donald W., to Xerox Corporation. Method for covering a book with a single sheet. 3,987,601, Cl. 53-3.000.

Watson, James M., to Cosden Technology, Inc. Polymerization inhibitor for vinyl aromatic compounds. 3,988,212, Cl. 203-9.000.

Watts, Golden F.; and Coats, Carlton E., to Ashland Oil, Inc. Production of thermoset water-in-oil emulsions. 3,988,272, Cl. 260-22.0CB.

Weatherhead, Roger G.: *See—*
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Weber, Karl-Heinz, to Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H. Method and apparatus for controlling the steplesaly variable cutting rate and feed rate of mining machines. 3,988,578, Cl. 235-151.100.

Weber, Willis W.; and Best, Donald F., to Union Carbide Corporation. Oxidative revivification of molecular sieve catalysts admixed with refractory particles. 3,988,260, Cl. 252-418.000.

Weeks, Douglas H.; Bond, David A.; Schreyer, Warren C.; and Bloodworth, John M., to United States of America, Navy. General purpose logistic trailer. 3,987,919, Cl. 214-506.000.

Wehrli, Pius Anton, to Hoffmann-La Roche Inc. Synthesis of 2-methyl-3-buten-2-ol. 3,988,382, Cl. 260-643.00R.

Weinstein, Howard M. Motor vehicle trunk accessory. 3,988,032, Cl. 296-76.000.

Weinstein, Marvin J.; Wagman, Gerald H.; and Marquez, Joseph A., to Schering Corporation. Antibiotics sisomicin and verdamicin I and complex containing same. 3,988,316, Cl. 536-17.000.

Weinstein, Morris, to American Cyanamid Company. Hair conditioning shampoo. 3,988,438, Cl. 424-70.000.

Weis, Gunter: *See—*
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Welck, Arnold Emil, to Deere & Company. Engine enclosure and heat deflector arrangement. 3,987,766, Cl. 123-41.660.

Welzel, Josef, to Hermann Hemscheidt Maschinenfabrik. Roof-supporting arrangement. 3,987,634, Cl. 61-45.00D.

Wendel, David G.: *See—*
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Werner, Wolfgang; Vogel, Peter; Tiedemann, Hugo; and Guthlein, Werner, to Boehringer Mannheim G.m.b.H. 9-Substituted 3-aminocarbazole compounds and test strip indicator compositions. 3,988,208, Cl. 195-103.50C.

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Westvaco Corporation: *See*—
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B 269,673	3,914,377	Oct. 21, 1975	B 311,911	3,925,233	Dec. 9, 1975
B 270,089	3,923,875	Dec. 2, 1975	B 312,139	3,925,530	Dec. 9, 1975
B 271,104	3,925,400	Dec. 9, 1975	B 312,477	3,923,714	Dec. 2, 1975
B 274,945	3,924,992	Dec. 9, 1975	B 313,098	3,925,045	Dec. 9, 1975
B 275,426	3,925,168	Dec. 9, 1975	B 313,531	3,925,548	Dec. 9, 1975
B 276,271	3,916,028	Oct. 28, 1975	B 313,594	3,924,626	Dec. 9, 1975
B 276,560	3,916,030	Oct. 28, 1975	B 313,900	3,915,932	Oct. 28, 1975
B 276,993	3,948,823	Apr. 6, 1976	B 314,049	3,920,588	Nov. 18, 1975
B 277,449	3,924,048	Dec. 2, 1975	B 314,255	3,923,764	Dec. 2, 1975
B 278,491	3,921,170	Nov. 18, 1975	B 314,271	3,921,845	Nov. 25, 1975
B 278,991	3,914,469	Oct. 21, 1975	B 314,489	3,925,016	Dec. 9, 1975
B 279,583	3,923,749	Dec. 2, 1975	B 314,800	3,930,087	Dec. 30, 1975
B 280,015	3,925,378	Dec. 9, 1975	B 314,977	3,923,459	Dec. 2, 1975
B 280,395	3,919,604	Nov. 11, 1975	B 315,363	3,920,673	Nov. 18, 1975
B 281,341	3,920,643	Nov. 18, 1975	B 315,397	3,923,963	Dec. 2, 1975
B 281,943	3,924,013	Dec. 2, 1975	B 315,731	3,914,108	Oct. 21, 1975
B 282,081	3,913,483	Oct. 21, 1975	B 316,014	3,920,861	Nov. 18, 1975
B 282,252	3,924,997	Dec. 9, 1975	B 316,239	3,913,546	Oct. 21, 1975
B 282,819	3,982,932	Sep. 28, 1976	B 316,917	3,925,494	Dec. 9, 1975
B 283,124	3,923,512	Dec. 2, 1975	B 317,080	3,925,324	Dec. 9, 1975
B 283,300	3,925,011	Dec. 9, 1975	B 317,347	3,923,552	Dec. 2, 1975
B 284,297	3,913,722	Oct. 21, 1975	B 317,624	3,925,167	Dec. 9, 1975
B 284,427	3,952,812	Apr. 27, 1976	B 318,195	3,915,699	Oct. 28, 1975
B 285,200	3,923,680	Dec. 2, 1975	B 318,618	3,915,365	Oct. 28, 1975
B 285,796	3,914,303	Oct. 21, 1975	B 318,640	3,925,186	Dec. 9, 1975
B 286,499	3,914,129	Oct. 21, 1975	B 318,745	3,916,571	Nov. 4, 1975
B 286,614	3,924,696	Dec. 9, 1975	B 319,226	3,925,082	Dec. 9, 1975
B 286,913	3,928,696	Dec. 23, 1975	B 319,339	3,916,056	Oct. 28, 1975
B 287,164	3,914,139	Oct. 21, 1975	B 319,402	3,919,568	Nov. 11, 1975
B 287,270	3,924,825	Dec. 9, 1975	B 319,414	3,928,666	Dec. 23, 1975
B 287,275	3,925,141	Dec. 9, 1975	B 320,261	3,924,033	Dec. 2, 1975
B 287,373	3,918,568	Nov. 11, 1975	B 320,452	3,925,083	Dec. 9, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 320,603	3,915,571	Oct. 28, 1975
B 321,018	3,921,623	Nov. 25, 1975
B 321,101	3,917,163	Nov. 4, 1975
B 321,938	3,923,889	Dec. 2, 1975
B 322,182	3,925,390	Dec. 9, 1975
B 322,239	3,920,973	Nov. 18, 1975
B 322,564	3,914,373	Oct. 21, 1975
B 322,611	3,920,863	Nov. 18, 1975
B 322,777	3,924,382	Dec. 9, 1975
B 323,127	3,923,967	Dec. 2, 1975
B 323,191	3,914,566	Oct. 21, 1975
B 323,203	3,916,165	Oct. 28, 1975
B 323,568	3,920,536	Nov. 18, 1975
B 323,666	3,924,568	Dec. 9, 1975
B 324,495	3,928,664	Dec. 23, 1975
B 324,503	3,928,524	Dec. 23, 1975
B 324,505	3,925,294	Dec. 9, 1975
B 324,739	3,924,990	Dec. 9, 1975
B 324,879	3,923,538	Dec. 2, 1975
B 325,102	3,924,355	Dec. 9, 1975
B 325,262	3,921,304	Nov. 25, 1975
B 326,514	3,925,080	Dec. 9, 1975
B 327,109	3,925,350	Dec. 9, 1975
B 327,363	3,923,504	Dec. 2, 1975
B 327,612	3,925,620	Dec. 9, 1975
B 327,674	3,918,540	Nov. 11, 1975
B 327,899	3,925,674	Dec. 9, 1975
B 328,164	3,914,703	Oct. 21, 1975
B 328,200	3,916,031	Oct. 28, 1975
B 328,205	3,914,106	Oct. 21, 1975
B 328,210	3,914,275	Oct. 21, 1975
B 328,870	3,916,486	Nov. 4, 1975
B 329,115	3,924,727	Dec. 9, 1975
B 329,476	3,920,562	Nov. 18, 1975
B 329,612	3,925,128	Dec. 9, 1975
B 329,787	3,920,688	Nov. 18, 1975
B 329,816	3,923,947	Dec. 2, 1975
B 330,536	3,925,452	Dec. 9, 1975
B 330,828	3,913,589	Oct. 21, 1975
B 331,417	3,914,157	Oct. 21, 1975
B 331,557	3,916,577	Nov. 4, 1975
B 331,895	3,916,403	Oct. 28, 1975
B 332,527	3,924,017	Dec. 2, 1975
B 332,811	3,924,359	Dec. 9, 1975
B 333,876	3,921,208	Nov. 18, 1975
B 333,928	3,927,172	Dec. 16, 1975
B 334,251	3,924,719	Dec. 9, 1975
B 334,868	3,919,469	Nov. 11, 1975
B 334,985	3,923,912	Dec. 2, 1975
B 335,670	3,928,686	Dec. 23, 1975
B 335,741	3,925,615	Dec. 9, 1975
B 335,773	3,920,953	Nov. 18, 1975
B 336,129	3,923,606	Dec. 2, 1975
B 336,243	3,925,422	Dec. 9, 1975
B 336,345	3,925,179	Dec. 9, 1975
B 336,652	3,914,211	Oct. 21, 1975
B 336,902	3,918,897	Nov. 11, 1975
B 336,946	3,919,425	Nov. 11, 1975
B 336,978	3,923,968	Dec. 2, 1975
B 337,235	3,919,386	Nov. 11, 1975
B 337,409	3,925,258	Dec. 9, 1975
B 337,442	3,913,658	Oct. 21, 1975
B 337,703	3,914,690	Oct. 21, 1975
B 337,787	3,923,506	Dec. 2, 1975
B 339,057	3,924,822	Dec. 9, 1975
B 339,218	3,925,121	Dec. 9, 1975
B 339,699	3,933,527	Jan. 20, 1976
B 339,838	3,930,221	Dec. 30, 1975
B 340,212	3,922,645	Nov. 25, 1975
B 340,833	3,925,208	Dec. 9, 1975
B 341,579	3,913,363	Oct. 21, 1975
B 342,084	3,928,694	Dec. 23, 1975
B 342,423	3,925,334	Dec. 9, 1975
B 342,886	3,923,507	Dec. 2, 1975
B 343,136	3,919,453	Nov. 11, 1975
B 343,240	3,925,693	Dec. 9, 1975
B 343,506	3,916,021	Oct. 28, 1975
B 343,577	3,921,165	Nov. 18, 1975
B 344,203	3,928,719	Dec. 23, 1975
B 344,479	3,924,042	Dec. 2, 1975
B 345,060	3,916,018	Oct. 28, 1975
B 345,384	3,916,146	Oct. 28, 1975
B 345,390	3,940,343	Feb. 24, 1976
B 345,422	3,914,392	Oct. 21, 1975
B 345,527	3,927,365	Dec. 16, 1975
B 345,567	3,913,985	Oct. 21, 1975
B 346,044	3,988,405	Oct. 26, 1976
B 346,165	3,913,293	Oct. 21, 1975
B 346,210	3,916,142	Oct. 28, 1975
B 346,350	3,915,824	Oct. 28, 1975
B 346,487	3,927,406	Dec. 16, 1975
B 346,585	3,913,820	Oct. 21, 1975
B 346,613	3,923,545	Dec. 2, 1975
B 346,901	3,915,583	Oct. 28, 1975
B 348,083	3,923,774	Dec. 2, 1975
B 348,383	3,923,452	Dec. 2, 1975
B 348,495	3,914,654	Oct. 21, 1975
B 348,558	3,914,109	Oct. 21, 1975
B 349,141	3,915,363	Oct. 28, 1975
B 349,177	3,914,033	Oct. 21, 1975
B 349,231	3,915,831	Oct. 28, 1975
B 349,321	3,916,103	Oct. 28, 1975
B 349,948	3,914,557	Oct. 21, 1975
B 350,025	3,927,415	Dec. 16, 1975
B 350,143	3,924,419	Dec. 9, 1975
B 350,219	3,917,802	Nov. 4, 1975
B 350,245	3,914,331	Oct. 21, 1975
B 350,523	3,924,726	Dec. 9, 1975
B 350,589	3,927,419	Dec. 16, 1975
B 350,708	3,923,871	Dec. 2, 1975
B 350,843	3,915,461	Oct. 28, 1975
B 351,055	3,914,074	Oct. 21, 1975
B 351,218	3,914,186	Oct. 21, 1975
B 351,222	3,921,179	Nov. 18, 1975
B 351,348	3,923,563	Dec. 2, 1975
B 351,421	3,914,733	Oct. 21, 1975
B 351,493	3,914,758	Oct. 21, 1975
B 351,535	3,915,239	Oct. 28, 1975
B 351,665	3,919,701	Nov. 11, 1975
B 351,672	3,914,000	Oct. 21, 1975
B 351,735	3,913,385	Oct. 21, 1975
B 351,863	3,914,700	Oct. 21, 1975
B 351,883	3,924,657	Dec. 9, 1975
B 351,926	3,914,133	Oct. 21, 1975
B 351,939	3,913,480	Oct. 21, 1975
B 352,445	3,928,746	Dec. 23, 1975
B 352,934	3,913,692	Oct. 21, 1975
B 352,950	3,922,590	Nov. 25, 1975
B 352,965	3,921,926	Nov. 25, 1975
B 353,317	3,916,446	Nov. 4, 1975
B 353,387	3,924,404	Dec. 9, 1975
B 353,546	3,913,273	Oct. 21, 1975
B 354,008	3,925,081	Dec. 9, 1975
B 354,098	3,925,547	Dec. 9, 1975
B 354,145	3,927,279	Dec. 16, 1975
B 354,296	3,914,580	Oct. 21, 1975
B 354,510	3,928,658	Dec. 23, 1975
B 354,889	3,913,204	Oct. 21, 1975
B 354,979	3,914,251	Oct. 21, 1975
B 355,095	3,925,656	Dec. 9, 1975
B 355,269	3,914,561	Oct. 21, 1975
B 355,510	3,913,704	Oct. 21, 1975
B 355,595	3,925,649	Dec. 9, 1975
B 355,876	3,925,685	Dec. 9, 1975
B 356,032	3,928,636	Dec. 23, 1975
B 356,253	3,925,025	Dec. 9, 1975
B 356,602	3,927,393	Dec. 16, 1975
B 356,724	3,924,586	Dec. 9, 1975
B 357,039	3,924,406	Dec. 9, 1975
B 357,057	3,913,738	Oct. 21, 1975
B 357,131	3,924,453	Dec. 9, 1975
B 357,402	3,914,180	Oct. 21, 1975
B 357,682	3,924,973	Dec. 9, 1975
B 357,803	3,919,470	Nov. 11, 1975
B 358,174	3,924,958	Dec. 9, 1975
B 358,244	3,913,411	Oct. 21, 1975
B 358,311	3,923,561	Dec. 2, 1975
B 358,939	3,924,713	Dec. 9, 1975
B 359,174	3,914,117	Oct. 21, 1975
B 359,187	3,924,525	Dec. 9, 1975
B 359,540	3,915,235	Oct. 28, 1975
B 359,740	3,936,212	Feb. 3, 1976
B 359,791	3,929,430	Dec. 30, 1975
B 359,825	3,921,344	Nov. 25, 1975
B 359,946	3,914,132	Oct. 21, 1975
B 359,947	3,914,653	Oct. 21, 1975
B 360,208	3,923,750	Dec. 2, 1975
B 360,296	3,916,720	Nov. 4, 1975
B 360,719	3,915,715	Oct. 28, 1975
B 360,910	3,925,696	Dec. 9, 1975
B 361,265	3,923,569	Dec. 2, 1975
B 361,443	3,927,405	Dec. 16, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 361,569	3,914,554	Oct. 21, 1975	B 384,658	3,913,452	Oct. 21, 1975
B 361,604	3,922,702	Nov. 25, 1975	B 384,773	3,915,416	Oct. 28, 1975
B 361,734	3,915,764	Oct. 28, 1975	B 385,210	3,913,406	Oct. 21, 1975
B 362,589	3,914,012	Oct. 21, 1975	B 386,403	3,924,895	Dec. 9, 1975
B 363,205	3,923,744	Dec. 2, 1975	B 386,592	3,925,305	Dec. 9, 1975
B 363,337	3,928,639	Dec. 23, 1975	B 387,039	3,924,510	Dec. 9, 1975
B 363,457	3,922,595	Nov. 25, 1975	B 387,331	3,913,701	Oct. 21, 1975
B 363,674	3,929,716	Dec. 30, 1975	B 387,363	3,927,378	Dec. 16, 1975
B 363,892	3,913,395	Oct. 21, 1975	B 387,687	3,918,151	Nov. 11, 1975
B 363,962	3,921,826	Nov. 25, 1975	B 387,761	3,914,245	Oct. 21, 1975
B 364,022	3,913,499	Oct. 21, 1975	B 387,790	3,925,380	Dec. 9, 1975
B 364,163	3,916,092	Oct. 28, 1975	B 387,818	3,918,935	Nov. 11, 1975
B 364,241	3,916,668	Nov. 4, 1975	B 388,580	3,923,712	Dec. 2, 1975
B 364,334	3,924,670	Dec. 9, 1975	B 389,070	3,914,171	Oct. 21, 1975
B 364,528	3,919,510	Nov. 11, 1975	B 389,285	3,914,631	Oct. 21, 1975
B 364,786	3,921,673	Nov. 25, 1975	B 389,327	3,924,504	Dec. 9, 1975
B 364,910	3,925,335	Dec. 9, 1975	B 389,639	3,914,626	Oct. 21, 1975
B 365,371	3,988,181	Oct. 26, 1976	B 389,726	3,921,010	Nov. 18, 1975
B 365,490	3,918,527	Nov. 11, 1975	B 389,807	3,922,623	Nov. 25, 1975
B 365,834	3,914,702	Oct. 21, 1975	B 389,932	3,913,268	Oct. 21, 1975
B 365,841	3,925,628	Dec. 9, 1975	B 389,933	3,913,267	Oct. 21, 1975
B 365,855	3,917,258	Nov. 4, 1975	B 390,679	3,913,668	Oct. 21, 1975
B 366,287	3,924,946	Dec. 9, 1975	B 390,732	3,913,878	Oct. 21, 1975
B 366,402	3,928,053	Dec. 23, 1975	B 391,184	3,914,214	Oct. 21, 1975
B 366,589	3,914,719	Oct. 21, 1975	B 391,210	3,914,220	Oct. 21, 1975
B 367,021	3,914,752	Oct. 21, 1975	B 391,437	3,915,416	Oct. 28, 1975
B 367,040	3,924,775	Dec. 9, 1975	B 391,509	3,925,175	Dec. 9, 1975
B 367,661	3,914,158	Oct. 21, 1975	B 391,675	3,916,017	Oct. 28, 1975
B 367,739	3,923,648	Dec. 2, 1975	B 392,154	3,923,809	Dec. 2, 1975
B 367,812	3,924,789	Dec. 9, 1975	B 392,242	3,926,636	Dec. 16, 1975
B 368,081	3,924,691	Dec. 9, 1975	B 392,696	3,916,175	Oct. 28, 1975
B 368,387	3,924,923	Dec. 9, 1975	B 392,732	3,914,903	Oct. 21, 1975
B 368,392	3,913,812	Oct. 21, 1975	B 392,753	3,916,341	Oct. 28, 1975
B 368,397	3,914,677	Oct. 21, 1975	B 392,894	3,914,763	Oct. 21, 1975
B 368,862	3,925,549	Dec. 9, 1975	B 393,163	3,914,535	Oct. 21, 1975
B 369,563	3,924,449	Dec. 9, 1975	B 393,347	3,985,800	Oct. 12, 1976
B 369,607	3,923,786	Dec. 2, 1975	B 393,970	3,914,638	Oct. 21, 1975
B 369,997	3,913,533	Oct. 21, 1975	B 394,088	3,914,740	Oct. 21, 1975
B 370,453	3,964,101	Jun. 15, 1976	B 394,188	3,924,591	Dec. 9, 1975
B 370,706	3,925,242	Dec. 9, 1975	B 394,300	3,914,159	Oct. 21, 1975
B 371,073	3,930,135	Dec. 30, 1975	B 394,712	3,916,306	Oct. 28, 1975
B 371,085	3,923,783	Dec. 2, 1975	B 395,478	3,922,577	Nov. 25, 1975
B 371,787	3,921,217	Nov. 18, 1975	B 395,496	3,919,435	Nov. 11, 1975
B 371,805	3,914,433	Oct. 21, 1975	B 395,671	3,920,418	Nov. 18, 1975
B 371,836	3,923,541	Dec. 2, 1975	B 395,889	3,913,190	Oct. 21, 1975
B 372,823	3,924,660	Dec. 9, 1975	B 396,025	3,913,869	Oct. 21, 1975
B 373,297	3,924,436	Dec. 9, 1975	B 396,551	3,921,929	Nov. 25, 1975
B 373,326	3,920,433	Nov. 18, 1975	B 397,027	3,923,736	Dec. 2, 1975
B 373,428	3,915,511	Oct. 28, 1975	B 397,527	3,913,488	Oct. 21, 1975
B 375,220	3,920,417	Nov. 18, 1975	B 397,990	3,914,848	Oct. 28, 1975
B 375,652	3,921,303	Nov. 25, 1975	B 398,262	3,913,481	Oct. 21, 1975
B 376,504	3,914,570	Oct. 21, 1975	B 398,551	3,924,924	Dec. 9, 1975
B 376,654	3,922,513	Nov. 25, 1975	B 398,597	3,913,743	Oct. 21, 1975
B 376,742	3,924,392	Dec. 9, 1975	B 398,625	3,920,996	Nov. 18, 1975
B 376,799	3,913,955	Oct. 21, 1975	B 399,292	3,914,810	Oct. 28, 1975
B 377,172	3,918,255	Nov. 11, 1975	B 399,304	3,919,567	Nov. 11, 1975
B 377,683	3,924,433	Dec. 9, 1975	B 399,349	3,925,694	Dec. 9, 1975
B 377,833	3,913,884	Oct. 21, 1975	B 399,766	3,915,667	Oct. 28, 1975
B 377,869	3,917,002	Nov. 4, 1975	B 400,080	3,925,163	Dec. 9, 1975
B 378,621	3,923,840	Dec. 2, 1975	B 400,293	3,923,719	Dec. 2, 1975
B 379,038	3,923,994	Dec. 2, 1975	B 400,310	3,915,507	Oct. 28, 1975
B 379,172	3,914,379	Oct. 21, 1975	B 401,133	3,924,443	Dec. 9, 1975
B 379,282	3,913,462	Oct. 21, 1975	B 401,992	3,924,898	Dec. 9, 1975
B 379,955	3,913,157	Oct. 21, 1975	B 402,065	3,925,413	Dec. 9, 1975
B 380,014	3,921,915	Nov. 25, 1975	B 402,555	3,914,688	Oct. 21, 1975
B 380,141	3,925,161	Dec. 9, 1975	B 403,140	3,913,486	Oct. 21, 1975
B 380,310	3,921,048	Nov. 18, 1975	B 403,355	3,913,352	Oct. 21, 1975
B 380,312	3,913,953	Oct. 21, 1975	B 403,990	3,914,684	Oct. 21, 1975
B 380,338	3,924,873	Dec. 9, 1975	B 403,996	3,916,016	Oct. 28, 1975
B 380,446	3,923,836	Dec. 2, 1975	B 404,290	3,924,918	Dec. 9, 1975
B 380,900	3,913,307	Oct. 21, 1975	B 404,437	3,915,200	Oct. 28, 1975
B 380,926	3,925,095	Dec. 9, 1975	B 405,136	3,915,565	Oct. 28, 1975
B 381,074	3,919,583	Nov. 11, 1975	B 405,137	3,915,566	Oct. 28, 1975
B 381,632	3,914,732	Oct. 21, 1975	B 405,160	3,924,821	Dec. 9, 1975
B 381,847	3,921,152	Nov. 18, 1975	B 405,248	3,926,294	Dec. 16, 1975
B 382,018	3,929,742	Dec. 30, 1975	B 405,305	3,922,111	Nov. 25, 1975
B 382,021	3,913,212	Oct. 21, 1975	B 405,360	3,913,403	Oct. 21, 1975
B 382,261	3,914,991	Oct. 28, 1975	B 405,495	3,924,577	Dec. 9, 1975
B 382,290	3,924,717	Dec. 9, 1975	B 405,938	3,920,109	Nov. 18, 1975
B 382,783	3,919,527	Nov. 11, 1975	B 406,065	3,914,199	Oct. 21, 1975
B 382,798	3,924,435	Dec. 9, 1975	B 406,357	3,924,529	Dec. 9, 1975
B 382,840	3,922,007	Nov. 25, 1975	B 406,800	3,952,708	Apr. 27, 1976
B 383,465	3,927,412	Dec. 16, 1975	B 407,736	3,924,463	Dec. 9, 1975
B 383,532	3,914,246	Oct. 21, 1975	B 407,357	3,924,614	Dec. 9, 1975
B 383,581	3,925,318	Dec. 9, 1975	B 407,728	3,925,240	Dec. 9, 1975
B 384,499	3,925,135	Dec. 9, 1975	B 408,380	3,984,172	Oct. 5, 1976

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 408,487	3,924,046	Dec. 2, 1975
B 408,749	3,914,116	Oct. 21, 1975
B 409,026	3,925,497	Dec. 9, 1975
B 409,220	3,915,648	Oct. 28, 1975
B 409,251	3,922,620	Nov. 25, 1975
B 409,657	3,927,362	Dec. 16, 1975
B 409,816	3,921,317	Nov. 25, 1975
B 410,062	3,923,855	Dec. 2, 1975
B 410,168	3,914,717	Oct. 21, 1975
B 411,145	3,914,168	Oct. 21, 1975
B 411,356	3,919,649	Nov. 11, 1975
B 411,483	3,925,196	Dec. 9, 1975
B 411,633	3,914,741	Oct. 21, 1975
B 412,516	3,927,417	Dec. 16, 1975
B 412,619	3,925,292	Dec. 9, 1975
B 412,867	3,924,587	Dec. 9, 1975
B 413,006	3,914,850	Oct. 28, 1975
B 413,546	3,924,314	Dec. 9, 1975
B 414,129	3,925,484	Dec. 9, 1975
B 414,288	3,925,537	Dec. 9, 1975
B 415,113	3,915,717	Oct. 28, 1975
B 415,124	3,915,944	Oct. 28, 1975
B 415,845	3,925,076	Dec. 9, 1975
B 415,847	3,914,208	Oct. 21, 1975
B 415,957	3,925,635	Dec. 9, 1975
B 415,977	3,927,359	Dec. 16, 1975
B 416,598	3,923,473	Dec. 2, 1975
B 416,832	3,924,975	Dec. 9, 1975
B 416,710	3,923,746	Dec. 2, 1975
B 416,933	3,924,968	Dec. 9, 1975
B 417,299	3,918,235	Nov. 11, 1975
B 418,121	3,925,023	Dec. 9, 1975
B 418,153	3,925,251	Dec. 9, 1975
B 418,302	3,913,252	Oct. 21, 1975
B 419,327	3,921,197	Nov. 18, 1975
B 419,481	3,924,970	Dec. 9, 1975
B 420,016	3,914,572	Oct. 21, 1975
B 420,148	3,927,414	Dec. 16, 1975
B 420,514	3,923,929	Dec. 2, 1975
B 420,568	3,925,069	Dec. 9, 1975
B 421,026	3,914,785	Oct. 21, 1975
B 421,362	3,924,817	Dec. 9, 1975
B 421,383	3,925,047	Dec. 9, 1975
B 421,797	3,914,023	Oct. 21, 1975
B 422,399	3,928,656	Dec. 23, 1975
B 422,467	3,924,804	Dec. 9, 1975
B 422,949	3,921,873	Nov. 25, 1975
B 424,415	3,919,458	Nov. 11, 1975
B 424,462	3,920,522	Nov. 18, 1975
B 424,572	3,924,979	Dec. 9, 1975
B 424,748	3,924,395	Dec. 9, 1975
B 425,035	3,914,025	Oct. 21, 1975
B 425,345	3,922,015	Nov. 25, 1975
B 425,470	3,923,796	Dec. 2, 1975
B 425,539	3,916,742	Nov. 4, 1975
B 425,541	3,914,051	Oct. 21, 1975
B 425,572	3,923,822	Dec. 2, 1975
B 427,631	3,921,433	Nov. 25, 1975
B 428,177	3,914,624	Oct. 21, 1975
B 428,795	3,921,056	Nov. 18, 1975
B 429,442	3,923,485	Dec. 2, 1975
B 430,106	3,918,941	Nov. 11, 1975
B 430,140	3,922,084	Nov. 25, 1975
B 430,798	3,918,204	Nov. 11, 1975
B 430,944	3,922,096	Nov. 25, 1975
B 432,373	3,919,670	Nov. 11, 1975
B 433,587	3,914,567	Oct. 21, 1975
B 435,343	3,919,244	Nov. 11, 1975
B 435,844	3,925,170	Dec. 9, 1975
B 437,173	3,924,627	Dec. 9, 1975
B 437,172	3,913,251	Oct. 21, 1975
B 437,195	3,914,618	Oct. 21, 1975
B 437,450	3,922,479	Nov. 25, 1975
B 438,053	3,916,013	Oct. 28, 1975
B 438,706	3,925,050	Dec. 9, 1975
B 439,168	3,919,676	Nov. 11, 1975
B 439,669	3,921,499	Nov. 25, 1975
B 440,898	3,921,789	Nov. 25, 1975
B 441,024	3,913,629	Oct. 21, 1975
B 441,416	3,913,851	Oct. 21, 1975
B 442,280	3,914,054	Oct. 21, 1975
B 442,859	3,918,570	Nov. 11, 1975
B 442,919	3,925,483	Dec. 9, 1975
B 444,614	3,927,996	Dec. 23, 1975
B 445,471	3,914,711	Oct. 21, 1975
B 445,740	3,923,612	Dec. 2, 1975
B 448,571	3,924,760	Dec. 9, 1975
B 449,647	3,916,797	Nov. 4, 1975
B 450,499	3,920,526	Nov. 18, 1975
B 450,546	3,924,417	Dec. 9, 1975
B 450,927	3,913,844	Oct. 21, 1975
B 455,520	3,922,543	Nov. 25, 1975
B 455,775	3,914,356	Oct. 21, 1975
B 456,346	3,914,531	Oct. 21, 1975
B 459,425	3,928,773	Dec. 23, 1975
B 461,872	3,919,586	Nov. 11, 1975
B 467,684	3,915,119	Oct. 28, 1975
B 468,198	3,925,340	Dec. 9, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976	B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976	B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976	B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976	B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976	B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976	B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976	B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976	B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976	B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976	B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976	B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976	B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976	B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976	B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976	B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976	B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976	B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976	B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976	B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976	B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976	B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976	B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976	B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976	B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976	B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976	B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976	B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976	B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976	B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976	B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976	B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976	B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976	B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976	B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976	B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976	B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976	B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976	B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976	B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976	B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976	B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976	B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976	B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976	B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 519,932	3,988,618	Feb. 3,, 1976	Oct. 26, 1976	B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976	B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976	B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976	B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976	B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976	B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976	B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976	B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976	B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976	B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976	B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976	B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976	B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976	B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976	B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976	B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976	B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976	B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976	B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976	B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976	B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976	B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976	B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976	B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976	B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976	B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976	B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976	B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976	B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976	B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976	B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976	B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976	B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976	B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976	B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976	B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976	B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976	B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976	B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976	B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976	B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976	B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 533,056	3,983,969	Jan. 13,1976	Oct. 5, 1976	B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976	B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976	B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976	B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976	B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976	B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976	B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976	B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF OCTOBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Altherr, Russell George, to AMSTED Industries Incorporated. Railway Coupler Shank Keyslot Contour. Re. 29,011, Cl. 213-64.000.

AMSTED Industries Incorporated: *See*—
Altherr, Russell George, Re. 29,011.

Balkin, Larry M.: *See*—
Faires, Tony D.; and Balkin, Larry M., Re. 29,013.

BASF Wyandotte Corporation: *See*—
Pizzini, Louis C.; Ramlow, Gerhard G.; Patton, John T., Jr.; and Levis, William W., Jr., Re. 29,014.

Bell & Howell Company: *See*—
Jeffers, Frederick J., Re. 29,009.

Container Corporation of America: *See*—
Faires, Tony D.; and Balkin, Larry M., Re. 29,013.

Davies, Arthur S.: *See*—
Good, William E.; and Davies, Arthur S., Re. 29,012.

De Angelo, Michael Anthony; and Sharp, Donald Jex, to Western Electric Company, Inc. Method of generating precious metal-reducing patterns. Re. 29,015, Cl. 427-54.000.

Faires, Tony D.; and Balkin, Larry M., to Container Corporation of America. Easy packing deep container. Re. 29,013, Cl. 229-37.00R.

Garuts, Valdis E., to Tektronix, Inc. Continuously variable resistance attenuator using lossy transmission line and having constant signal transit time. Re. 29,018, Cl. 333-81.00A.

Good, William E.; and Davies, Arthur S., to Kelsey-Hayes Company. Cable welding tool. Re. 29,012, Cl. 228-3.100.

Hildenbrandt, Leon H., to International Business Machines Corporation. Illumination system for copier machines arranged to minimize glare with respect to an operator. Re. 29,017, Cl. 240-41.35R.

International Business Machines Corporation: *See*—
Hildenbrandt, Leon H., Re. 29,017.

Jeffers, Frederick J., to Bell & Howell Company. High sensitivity semiconductor strain gauge. Re. 29,009, Cl. 73-88.5SD.

Kelsey-Hayes Company: *See*—
Good, William E.; and Davies, Arthur S., Re. 29,012.

Levis, William W., Jr.: *See*—
Pizzini, Louis C.; Ramlow, Gerhard G.; Patton, John T., Jr.; and Levis, William W., Jr., Re. 29,014.

Patton, John T., Jr.: *See*—
Pizzini, Louis C.; Ramlow, Gerhard G.; Patton, John T., Jr.; and Levis, William W., Jr., Re. 29,014.

Peacock, George Raymond, to Thermatool Corporation. Welding and forming method. Re. 29,016, Cl. 219-9.500.

Pizzini, Louis C.; Ramlow, Gerhard G.; Patton, John T., Jr.; and Levis, William W., Jr., to BASF Wyandotte Corporation. Highly-stable graft copolymer dispersions in polyols containing unsaturation and polyurethanes prepared therefrom. Re. 29,014, Cl. 260-33.20R.

Ramlow, Gerhard G.: *See*—
Pizzini, Louis C.; Ramlow, Gerhard G.; Patton, John T., Jr.; and Levis, William W., Jr., Re. 29,014.

Sharp, Donald Jex: *See*—
De Angelo, Michael Anthony; and Sharp, Donald Jex, Re. 29,015.

Shtrikman, Shmuel, to Yeda Research & Development Co. Ltd. Intruder detection system. Re. 29,019, Cl. 340-258.00C.

Spence, Larry A. Oral cavity size controlled musical sound apparatus and method. Re. 29,010, Cl. 84-1.050.

Tektronix, Inc.: *See*—
Garuts, Valdis E., Re. 29,018.

Thermatool Corporation: *See*—
Peacock, George Raymond, Re. 29,016.

Western Electric Company, Inc.: *See*—
De Angelo, Michael Anthony; and Sharp, Donald Jex, Re. 29,015.

Yeda Research & Development Co. Ltd.: *See*—
Shtrikman, Shmuel, Re. 29,019.

LIST OF PLANT PATENTEES

Duffett, William E.: *See*—
Jessel, Walter H., Jr., and Duffett. 3,969.
Mack, Grace H., Duffett, and Jessel. 3,970.

Hudson, Earl D. Camellia. 3,966, 10–26–76, Cl. 61.

Jessel, Walter H., Jr., and W. E. Duffett to Yoder Brothers, Inc. Chrysanthemum plant. 3,969, 10–26–76, Cl. 39.

Mack, Grace H., W. E. Duffett, and W. H. Jessel Jr., to Grace H. Mack. Chrysanthemum plant. 3,970, 10–26–76, Cl. 77.

McLeod, Alexander C. Peach tree. 3,965, 10–26–76, Cl. 43.

Mikkelsens, Inc.: *See*—
Woodriff, Leslie. 3,968.

Rohde-Hieger, Margarete. Begonia plant. 3,967, 10–26–76, Cl. 68.

Wong, Henry G. Nectarine tree. 3,964, 10–26–76, Cl. 41.

Woodriff, Leslie, to Mikkelsens, Inc. Begonia plant. 3,968, 10–26–76, Cl. 68.

Yoder Brothers, Inc.: *See*—
Jessel, Walter H., Jr., and Duffett. 3,969.

LIST OF DESIGN PATENTEES

AMP Inc.: *See*—
Sheesley, Wilmer L., and Hooper. 242,047.

Arrow Converting Equipment, Inc.: *See*—
Mastriani, Elvin A., and R. E. 242,070.

Barber, Ivan J., to The Allen Group Inc. Support for car cleaning equipment or the like. 242,067. 10–26–76. Cl. D15—56.

Barber, Ivan J., to The Allen Group Inc. Support for car cleaning equipment or the like. 242,068, 10–26–76, Cl. D15—56.

Barber, Ivan J. Support for car cleaning equipment or the like. 242,069. 10–26–76, Cl. D15—56.

Bedol, Marshall, to Marshallan Products, Inc. Snack table. 242,007, 10–26–76, Cl. D6—177.

Brickwood, David B. L., to Strathearn Audio Ltd. Phonograph turntable. 242,075, 10–26–76, Cl. D56—4.

Brickwood, David B. L., to Strathearn Audio Ltd. Phonograph turntable. 242,076, 10–26–76, Cl. D56—4.

Brickwood, David B. L., to Strathearn Audio Ltd. Phonograph turntable. 242,077, 10–26–76, Cl. D56—4.

Bish, Robert M., to Mrs. Congetta Bish. Packaging. 242,922, 10–26–76, Cl. D9—249.

Bissell, James D. Game board. 242,054, 10–26–76, Cl. D34—5.

Brown, Donald W. Storage compartment for use signs within. 242,000, 10–26–76, Cl. D6—164.

Brown, Dwight C. Molded one piece bingo game board. 242,055, 10–26–76, Cl. D34—5.

Brown, Linda C. Wall mounted match holder. 242,051, 10–26–76, Cl. D27—32.

Busche, Francis X., and J. F. Miller. Trolley. 242,015, 10–26–76. Cl. D8—217.

Busche, Francis X., and J. F. Miller. Trolley. 242,016, 10–26–76, Cl. D8—217.

Campagnolo, Tullio. Derailleur. 242,033. 10–26–76, Cl. D12—124.

Card, Isabel M., and I. W. Sanner. Card holder. 242,056, 10–26–76, Cl. D34—13.

Carroll, James C., to Phillips Petroleum Co. Stacking container. 242,082, 10–26–76, Cl. D87—1.

Carter, Roland P., to Lane Co., Inc. Table. 241,999. 10–26–76, Cl. D6—149.

Carter, Roland P., to Lane Co., Inc. Table. 242,001, 10–26–76, Cl. D6—175.

Casparro, John J., to Don Fedderson Productions, Inc. Moving advertising sign display for stores. 242,086. 10–26–76, Cl. D96—12.

Chase, David O.: *See*—
Maloney, Martin V., and Chase. 242,085.

Conwed Corp.: *See*—
Manley, Stuart H., and Tacke. 242,063.

Coons, Gex B., and C. L. Seeley, to Gex B. Coons. Nap renewer for tennis ball. 242,053, 10–26–76. Cl. D34—5.

Corder, Thomas E., G. W. Lee, A. B. Johnson, and F. G. MacKay, to Teledyne Water Pik. Water filter. 242,043, 10–26–76, Cl. D23.

Cussigh, John L. Suction cup holding device for paint cans. 242,013. 10–26–76, Cl. D8—71.

Drawsky, Ronald H., and D. C. Thomas, to Kaiser Aluminum & Chemical Corp. Piling for the construction of retaining walls or the like. 242,034. 10–26–76, Cl. D25—74.

Drawsky, Ronald H., and D. C. Thomas, to Kaiser Aluminum & Chemical Corp. Piling for the construction of retaining walls or the like. 242,035. 10–26–76, Cl. D25—74.

Drawsky, Ronald H., and D. C. Thomas, to Kaiser Aluminum & Chemical Corp. Piling for the construction of retaining walls or the like. 242,036. 10–26–76, Cl. D25—74.

Dutler, Joseph A. Comb. 242,080, 10–26–76, Cl. D86—8.
Evans, Franklin J., to E. I. du Pont de Nemours & Co. Lace fabric. 242,061, 10–26–76, Cl. D47—6.
Faber, William G., to Imperial Imagineering Ltd. Table. 242,002, 10–26–76, Cl. D6—175.
Faber, William G., to Imperial Imagineering Ltd. Table. 242,003. 10–26–76, Cl. D6—175.
Faber, William G., to Imperial Imagineering Ltd. Table 242,004, 10–26–76, Cl. D6—175.
Faber, William G., to Imperial Imagineering Ltd. Table. 242,005, 10–26–76, Cl. D6—175.
Faber, William G., to Imperial Imagineering Ltd. Table. 242,006, 10–26–76, Cl. D6—175.
Famolare, Joseph P., Jr. Athletic shoe sole. 241,988, 10–26–76, Cl. D3—320.
Fenwick, Jay G., to Litton Business Systems, Inc. Checkout counter or similar article. 241,996, 10–26–76, Cl. D6—143.
Fenwick, Jay G., to Litton Business Systems, Inc. Checkout counter or similar article. 241,997, 10–26–76, Cl. D6—143.
France, George E. Post cap and truss tie unit. 242,037, 10–26–76, Cl. D25—61.
Frode, Per Enar Lennart, to Nife Jungner AB. Combined accumulator battery and connector cover therefor. 242,048, 10–26–76, Cl. D26—4.
Gardner, Glen A., to Phototron Co. Photographic service drive-in kiosk. 242,038, 10–26–76, Cl. D25—16.
Gargione, Frank V. Combined bottle and clip therefor. 242,018, 10–26–76, Cl. D9—10.
Glass, Rob R., to Lyall Electric, Inc. Lamp socket. 242,045. 10–26–76, Cl. D26—1.
Glass, Rob R., to Lyall Electric, Inc. Lamp socket. 242,046, 10–26–76, Cl. D26—1.
Glassman, Frederick R. Light fixture. 242,064, 10–26–76, Cl. D48—23.
Glassman, Frederick R. Light fixture. 242,065, 10–26–76, Cl. D48—23.
Habelt, Gerhard, to U.S. Philips Corp. Rack for cassettes. 242,010, 10–26–76, Cl. D6—188.
Hansen, Roger: *See*—
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Hartlaub, Harold L., to A & H Accessory Co. Sissy bar for motorcycles. 242,032, 10–26–76, Cl. D12—119.
Hemingway, Vernon M. Mobile book rack and storage box combination. 242,009, 10–26–76, Cl. D6—184.
Hooper, Dean R.: *See*—
Sheesley, Wilmer L., and Hooper. 242,047.
Hughes, Robert O.: *See*—
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Hunt, William C. Container lid. 242,023, 10–26–76, Cl. D9—254.
Hunter, Donald R. Window greenhouse. 242,058, 10–26–76, Cl. D25—35.
Jean, Robert A., to J. W. Lures, Inc. Tackle box or the like. 242,083, 10–26–76, Cl. D87—1.
Johns, Martha M., to E. I. du Pont de Nemours & Co. Lace fabric. 242,060, 10–26–76, Cl. D47—6.
Johnson, Allen B.: *See*—
Corder, Thomas E., Lee, Johnson, and MacKay. 242,043.
Jones, Robert S. Machine for rotating reel type mowers to lap in blades or the like. 242,071, 10–26–76, Cl. D15—149.
Kahn, Martin A. Combined decorative light and electronic bug killer. 242,066. 10–26–76, Cl. D48—24.
Kaiser Aluminum & Chemical Corp.: *See*—
Drawsky, Ronald H., and Thomas. 242,034.
Drawsky, Ronald H., and Thomas. 242,035.
Drawsky, Ronald H., and Thomas. 242,036.
Kasha, Michael, and R. L. Schneider, to Norlin Music Co. Truss rod cover for guitar or similar article. 242,073, 10–26–76, Cl. D56—1.
Kasha, Michael, S. E. Rendell, and R. L. Schneider, to Norlin Music, Inc., Guitar or similar article. 242,074, 10–26–76, Cl. D56—1.
Kotajarvi, Reino. Icedrill. 242,012, 10–26–76, Cl. D8—8.
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Lee, Gerald W.: *See*—
Corder, Thomas E., Lee, Johnson, and MacKay. 242,043.
Lewis, Richard. Invertible stool or similar article. 241,991, 10–26–76, Cl. D6—17.
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Shaner, Philip C., Hughes, Pomerson, and Hansen. 241,994.
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Macowski, William, to Ketcham & McDougall, Inc. Pencil well. 242,039, 10–26–76, Cl. D19—85.
Maloney, Martin V., and D. O. Chase, to Philip Morris Inc. Razor handle. 242,085, 10–26–76, Cl. D95—3.
Manley, Stuart H., and W. H. P. Tacke, to Conwed Corp. Framing module for lighting for ceilings or similar article. 242,063, 10–26–76, Cl. D48—7.
Marks, Robert J. Couch. 241,993, 10–26–76, Cl. D6—63.
Marsh, William J., to Saxon Water Conditioning Equipment, Inc. Water softener cabinet. 242,041, 10–26–76, Cl. D23—3.
Marsh, William J., to Saxon Water Conditioning Equipment, Inc. Water softener cabinet. 242,042, 10–26–76, Cl. D23—3.
Mastriani, Elvin A., and R. E. Mastriani, to Arrow Converting Equipment, Inc. Compact slitting mechanism. 242,070, 10–26–76, Cl. D15—127.
Mastriani, Robert E.: *See*—
Mastriani, Elvin A., and R. E. 242,070.
Mihos, Peter. Combined cigarette display and vending rack. 241,995, 10–26–76, Cl. D6—113.
Milan, Jesus M., to Productos Adex. S.A., de C.V. Fret engraved glove. 241,990, 10–26–76, Cl. D2—373.
Miller, John F.: *See*—
Busche, Francis X., and Miller. 242,015.
Busche, Francis X., and Miller. 242,016.
Moreton, George C., to Electronic Data Controls Corp. Drink dispenser. 242,084, 10–26–76, Cl. D15—112.
Morris, Philip, Inc.: *See*—
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Kasha, Michael, and Schneider. 242 073.
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O'Brien, James O. Clock or similar article. 242,025, 10–26–76, Cl. D10—8.
Okada, Tomoji, to General Electric Co. Combination radio and casette recorder. 242,050, 10–26–76, Cl. D26—14.
Perfect, Alan J., to Johnson & Johnson. Applicator for tooth sealant. 242,044, 10–26–76, Cl. D24—1.
Piper, Marguerite. Eyelash curler. 242,081, 10–26–76, Cl. D86—10.
Pomerson, William J.: *See*—
Shaner, Philip C., Hughes, Pomerson, and Hansen. 241,994.
Putman, Pauline E. Necklace made of woven beads. 242,059, 10–26–76, Cl. D11—8.
Reeves, Melbourne C., to Keene Corp. Illuminated sign. 242,087, 10–26–76, Cl. D96—12.
Rendell, Stanley E.: *See*—
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Reynolds, Raymond G., to Owens-Illinois, Inc. Bottle. 242,017, 10–26–76, Cl. D9—10.
Riswold, Albert W. Audio-visual instruction carrell. 241,992, 10–26–76, Cl. D6—25.
Robertson, James D., Jr. Knock-down storage rack or similar article. 242,011, 10–26–76, Cl. D6—189.
Rohrer, Mervin, and C. Wettlaufer, to Litton Business Systems, Inc. Rotatable storage unit. 241,998, 10–26–76, Cl. D6—148.
Salsgiver, John P. Typing stand. 242,008, 10–26–76, Cl. D6—179.
Sanner, Irene W.: *See*—
Card, Isabel M., and Sanner. 242,056.
Schneider, Richard L.: *See*—
Kasha, Michael, and Schneider. 242,073.
Kasha, Michael, Rendell, and Schneider. 242,074.
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1.1
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CL
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CL
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338
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10.1
18R
94R
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172R
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142EV
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CLA
94D
143
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31R
CLAS
69R
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CLASSIFICATION OF PATENTS

ISSUED OCTOBER 26, 1976

NOTE.—First number, class; second number, subclass; third number, patent number

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94R 3,988,109
159 3,987,508
172R 3,988,111

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116R 3,987,526
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157.1R 3,987,529
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195 3,988,119
203MW 3,987,531
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236 3,987,527
410 3,987,533
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427 3,987,535
526.6 3,987,536
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623.1 3,988,169
623.2 3,988,165
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14E 3,987,547
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59 3,987,549
3,987,550

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178E 3,987,552
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200 3,987,554
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CLASS 46
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44 3,987,581
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CLASS 47
29 3,987,583
34R 3,987,584
34.13 3,987,585

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CLASS 49
394 3,987,586
493 3,987,587
501 3,987,588

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100R 3,988,126
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34R 3,987,610
140BY 3,987,613
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CLASS 58
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50R 3,987,617
85.5 3,987,618
126R 3,987,619

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39.28T 3,987,620
204 3,987,621
420 3,987,622
422 3,987,623
431 3,987,624
3,987,625
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459 3,987,627
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516 3,987,629
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671 3,987,632
3,987,633
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67.8S 3,987,666
88E 3,987,667
88F 3,987,668
88R 3,987,669
88.5SD Re.29,009
104 3,987,670
114 3,987,671
146 3,987,672
194A 3,987,673
3,987,674
302 3,987,675
336.5 3,987,676
421.5R 3,987,677
422R 3,987,678

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10.54 3,987,680
89.15 3,987,681
117 3,987,682
229 3,987,683
233 3,987,684
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531 3,987,687
568FS 3,987,688
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109 3,988,150
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CLASS 83
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CLASS 96
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69 3,988,155
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87R 3,988,157
88 3,988,159

CLASS 98
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40N 3,987,713

CLASS 99
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279 3,987,716
280 3,987,717
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433 3,987,720

CLASS 101
18 3,987,721
91 3,987,722
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119 3,987,724
128.4 3,987,725
218 3,987,726
366 3,987,727
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66.5R 3,987,743
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410 3,987,754
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8.13 3,987,760
3,987,762
8.45 3,987,763
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32SP 3,987,765
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122F 3,987,772
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625.4 3,987,817
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637.3 3,987,819

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124 3,987,823

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CLASS 144
208F 3,987,825
309AC 3,987,826

CLASS 145
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26 3,988,175
32 3,988,176
111 3,988,177
133 3,988,178
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159 3,988,180
188 3,988,181

CLASS 150
.5 3,987,829

CLASS 151
41.73 3,987,830

CLASS 152

210 3,987,831
310 3,987,832
330R 3,987,833

CLASS 156

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71 3,988,187
143 3,988,188
3,988,189
145 3,988,190
218 3,988,191
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351 3,987,838
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290 3,988,200
3,988,201

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CLASS 164

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158 3,987,841
200 3,987,842
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CLASS 165

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142 3,988,527

CLASS 175

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375 3,987,859

CLASS 176

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3,988,532
6.8 3,988,533
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7.1 3,988,536
7.6 3,988,537
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15BV 3,988,544
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15.55T 3,988,546
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16EC 3,988,547
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68P 3,987,863
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128 3,987,866

CLASS 181

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CLASS 184

105R 3,987,869

CLASS 187

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CLASS 188

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3,987,879
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CLASS 195

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51R 3,988,205
62 3,988,206
3,988,207
103.5C 3,988,208
139 3,988,209

CLASS 197

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133R 3,987,886

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456 3,987,889
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802 3,987,888

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61.27 3,988,574
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153LB 3,988,555
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314 3,988,557
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306 3,987,899
313 3,987,900
451 3,987,901

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227 3,988,242
297 3,988,243
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500M 3,988,245

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1MS 3,987,908
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16.1C 3,987,912
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152 3,987,915
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505 3,987,918
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CLASS 217

26.5 3,987,922

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CLASS 222

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177 3,987,936
193 3,987,937
209 3,987,938
325 3,987,939
386 3,987,940
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402.15 3,987,942
570 3,987,943

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42.42A 3,987,945
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CLASS 225

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106 3,987,949

CLASS 227

116 3,987,950
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CLASS 228

2.5 3,987,952
3.1 Re.29,012
20 3,987,954
166 3,987,953

CLASS 229

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28R 3,987,956
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37R Re.29,013
54R 3,987,958
3,987,959
74 3,987,960

CLASS 233

27 3,987,961

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61.9R 3,988,571
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92SH 3,988,601
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150.1 3,988,602
150.53 3,988,600
151.1 3,988,577
3,988,578
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153AK 3,988,579
153AM 3,988,580
156 3,988,604
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169 3,987,964
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30 3,987,969
43 3,987,970
73 3,987,971
99 3,987,972
259.2 3,987,973

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71.8 3,987,975
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134 3,987,978
136 3,987,979
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46 3,987,985
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CLASS 248

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205R 3,987,992
210 3,987,993
226R 3,987,994
450 3,987,995
524 3,987,996

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CLASS 250

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227 3,988,614
253 3,988,615
270 3,988,581
272 3,988,582
315A 3,988,583
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Design Patents

6 :	242,009		242,086		242,025		242,005		242,044	41 :	242,056
	242,013	8 :	242,043		242,037		242,006		242,052	42 :	242,031
	242,021		242,087	18 :	242,045		242,015		242,057		242,032
	242,034	9 :	242,049		242,046		242,016		242,070		242,047
	242,035	10 :	242,061	20 :	242,030		242,058	35 :	242,051	48 :	242,022
	242,036	12 :	242,062	21 :	242,024		242,072	36 :	242,085		242,066
	242,038		242,071	25 :	241,995	27 :	241,994	37 :	242,054	51 :	241,989
	242,041		242,073		242,008		241,996		242,084		241,999
	242,042		242,074		242,011		241,997	39 :	242,007		242,001
	242,053		242,083		242,079		242,063		242,017	53 :	242,023
	242,059	13 :	241,992	26 :	242,002	34 :	242,018		242,020		242,080
	242,064		241,993		242,003		242,019	40 :	242,040	55 :	242,014
	242,065	16 :	242,000		242,004		242,039		242,082	56 :	242,067
	242,081	17 :	241,991								

Plant Patents

6 :	3,964		3,966		3,968	9 :	3,970	39 :	3,969	45 :	3,965

U. S. GOVERNMENT PRINTING OFFICE : O - 1976

U.S. DEPARTMENT OF COMMERCE
Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner